1/3/2019
r:\Structures\Str 3 Y2 over Y\Ustation\RFC - RI\403_000_U2519_SMU_TSH_000_770515.dgn
ttownsend

TIP PROJECT: U-2519AA&AB

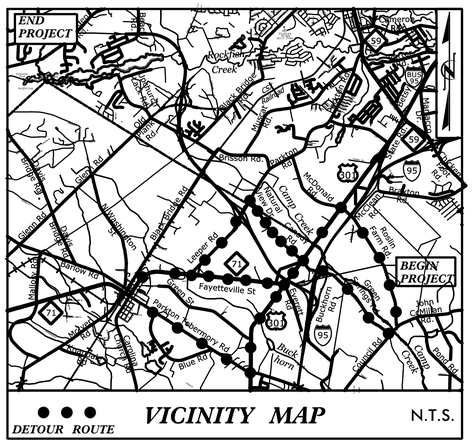
CONTRACT: C204043

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY /ROBESON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2519AA&AB		

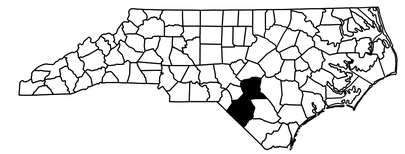
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34817.3.4	NHP-1118(11)	P.E., ROW, UTILITIES & CONSTRUCTION



VICINITY MAP

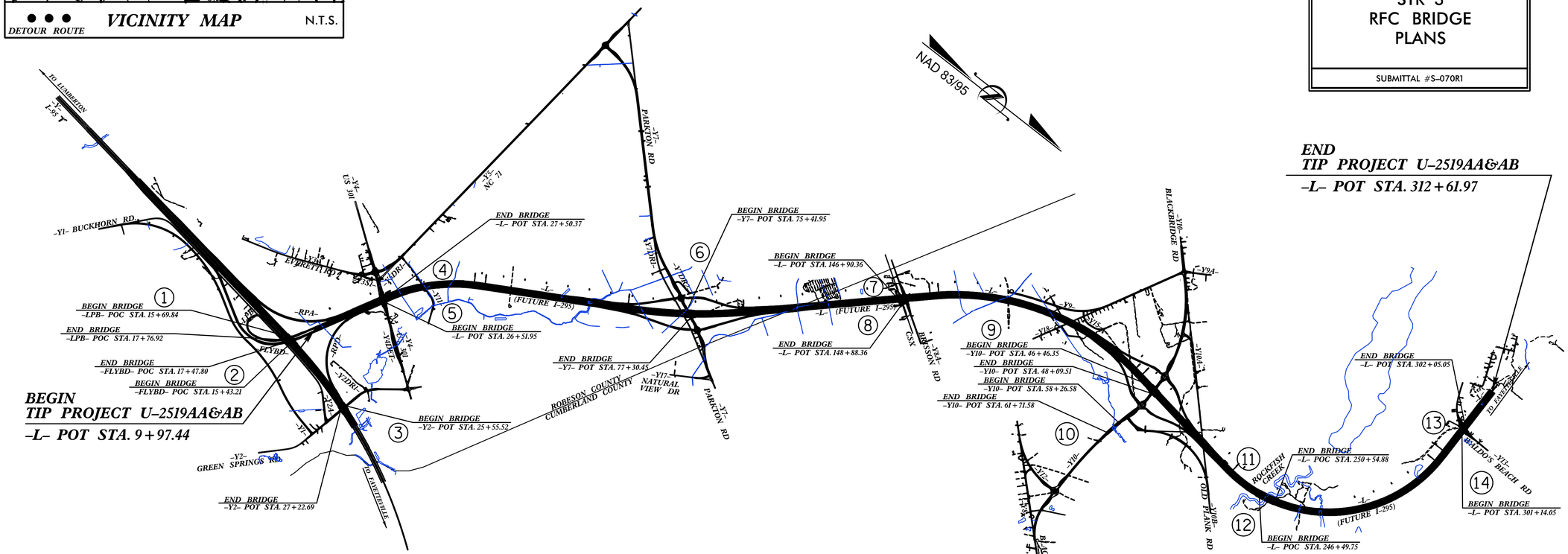
LOCATION: FUTURE I-295 - FAYETTEVILLE OUTER LOOP FROM I-95 IN ROBESON COUNTY TO SOUTH OF SR 1003 (CAMDEN ROAD) IN CUMBERLAND COUNTY

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING AND STRUCTURES



STR 3
RFC BRIDGE
PLANS

SUBMITTAL #S-070R1



BEGIN TIP PROJECT U-2519AA&AB
-L- POT STA. 9+97.44

END TIP PROJECT U-2519AA&AB
-L- POT STA. 312+61.97

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STRUCTURE

DESIGN DATA

ADT 2015 = 25,000
ADT 2040 = 33,100
K = 8%
D = 55%
T = 12%*
V = 70 MPH
* (TTST=4%+DUAL 8%)
FUNC. CLASSIFICATION = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2519AA & AB = 5.582 MILES
LENGTH STRUCTURE TIP PROJECT U-2519AA & AB = 0.150 MILES *
TOTAL LENGTH OF TIP PROJECT U-2519AA & AB = 5.732 MILES
* LENGTH BASED OFF NB BRIDGES

NCDOT CONTACT: K. ZAK HAMIDI, PE
PROJECT ENGINEER - DESIGN BUILD UNIT

PLANS PREPARED FOR THE NCDOT BY:
Balfour Beatty Infrastructure Inc. BRANCH CIVIL
A Joint Venture
in association with STV 100 Years

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 21, 2017

LETTING DATE:
NOVEMBER 21, 2017

JOSEPH A. FREEMAN, PE
DESIGN PROJECT MANAGER

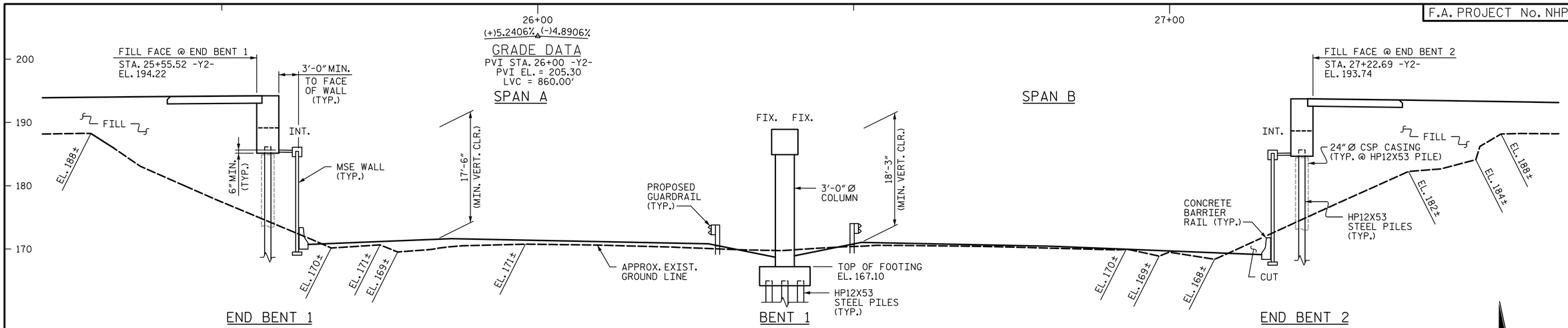
KEVIN G. BAILEY, PE
PROJECT DESIGN ENGINEER

STRUCTURAL ENGINEER

SEAL 34955
TIMOTHY J. TOWNSEND
1/3/2019

DocuSigned by:
Timothy J. Townsend
AAC798F6D6C7418...
P.E.
SIGNATURE:

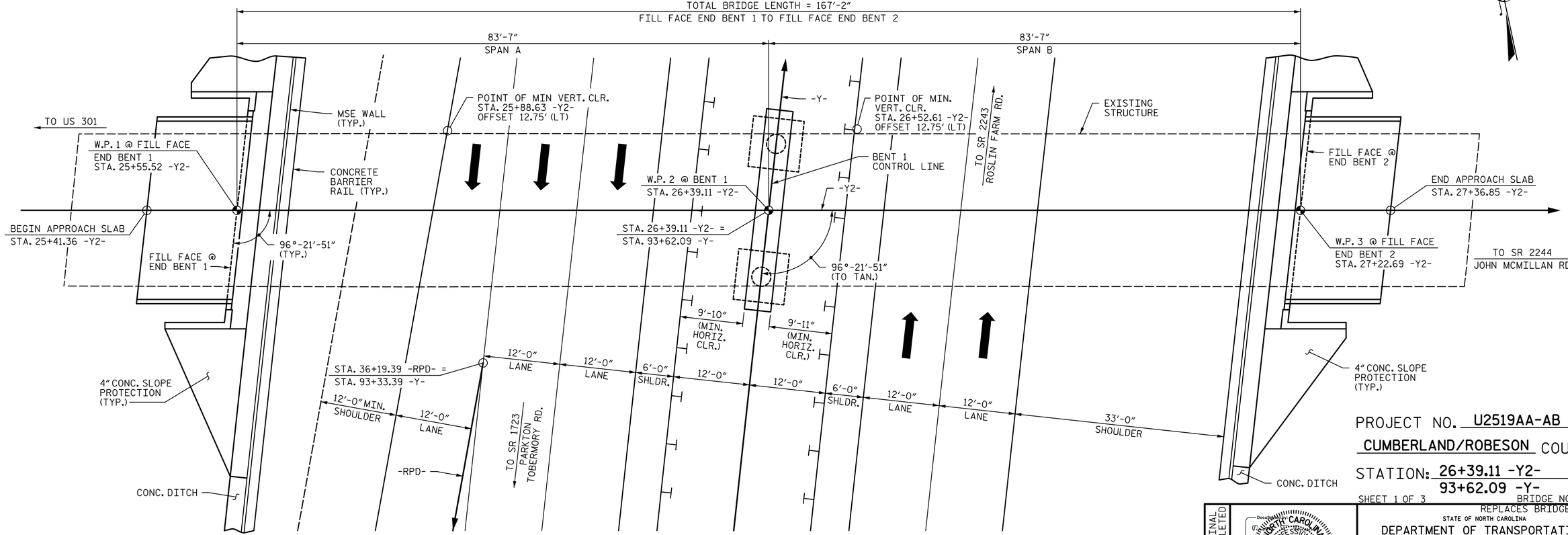
F.A. PROJECT No. NHP-1118(11)



SECTION ALONG -Y2-

(SECTIONS AT END BENTS AND BENT ARE SHOWN AT RIGHT ANGLES)
(EXISTING SUBSTRUCTURE NOT SHOWN FOR CLARITY)

TOTAL BRIDGE LENGTH = 167'-2"
FILL FACE END BENT 1 TO FILL FACE END BENT 2



PLAN

(PILES NOT SHOWN FOR CLARITY)
(END BENTS AND BENT ARE PARALLEL)

HORIZ. CURVE DATA -Y-

PI STA. = 107+61.69 -Y-
Δ = 33°16' 00.0" (RT)
D = 0°29' 59.9"
L = 6,653.82'
T = 3,423.64'
R = 11,460.00'

DRAWN BY : VKS	DATE : 9-18	DESIGN ENGINEER OF RECORD: T. TOWNSEND	DATE : 10-18
CHECKED BY : MLO	DATE : 9-18		

PROJECT NO. U2519AA-AB
CUMBERLAND/ROBESON COUNTY
STATION: 26+39.11 -Y2-
93+62.09 -Y-
SHEET 1 OF 3
BRIDGE NO. 770514
REPLACES BRIDGE NO. 169

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 34955 ENGINEER TIMOTHY J. TOWNSEND
1/3/2019

STV 100 Years
STV ENGINEERS, INC.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

Balfour Beatty Infrastructure Inc. / BRANCH CIVIL — A Joint Venture

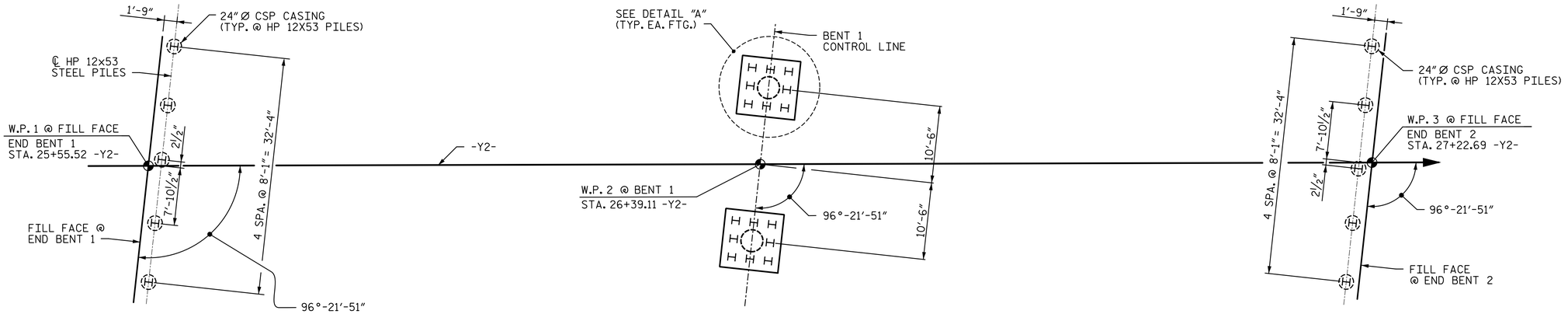
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON -Y2- (SR 1718 GREEN SPRINGS ROAD) OVER -Y- (I-95)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-1
1			3			TOTAL SHEETS
2			4			33

DATE: 1/3/2019 TIME: 6:08:58 AM
FILE: r:\Structures\Str 3 Y2 over Y\Ustation\RFC - R1\403.001.U2519.SMU.GD01.001.770515.dgn



END BENT 1 | BENT 1 | END BENT 2

FOUNDATION NOTES:

FOR PILES, SEE SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 140 TONS PER PILE.

PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 75 TONS PER PILE.

DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 100 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 140 TONS PER PILE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30 TO 40 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1, END BENT 2, AND BENT 1. THESE ESTIMATED ENERGY RANGES DO NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDAD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILE AT THE FIRST TWO BENTS THE CONTRACTOR ELECTS TO DRIVE AT WITH THE PDA DURING DRIVING IS REQUIRED AT END BENT 1, END BENT 2, OR BENT 1. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS AND FOR PILE DRIVING CRITERIA, SEE PILE DRIVING CRITERIA PROVISION.

PDA TESTING AT THE END BENTS SHOULD BE PERFORMED ON THE FIRST PRODUCTION PILE DRIVEN AT EACH SPECIFIED END BENT. THIS PDA TESTING SHOULD OCCUR PRIOR TO EMBANKMENT CONSTRUCTION. THE PDA TEST PILE SHOULD BE DRIVEN TO ACHIEVE THE REQUIRED DRIVING RESISTANCE FOR THE SPECIFIED END BENT. DRIVE CRITERIA SHOULD BE PROVIDED BASED ON THE PDA TESTING AND ALL REMAINING PRODUCTION PILES SHOULD BE DRIVEN TO THE REQUIRED DRIVING RESISTANCE PRIOR TO EMBANKMENT CONSTRUCTION.

WHERE RESTRIKES ARE NECESSARY TO ACHIEVE THE REQUIRED DRIVING RESISTANCE, THIS SHALL BE PERFORMED PRIOR TO EMBANKMENT CONSTRUCTION.

PILE RESTRIKES AT END BENTS WILL BE REQUIRED TO RELEASE DOWN DRAG LOADS AFTER OBSERVING A WAITING PERIOD OF 3 MONTHS AFTER EMBANKMENT FILL PLACEMENT TO WITHIN 1 FT OF THE BOTTOM OF CAP ELEVATION.

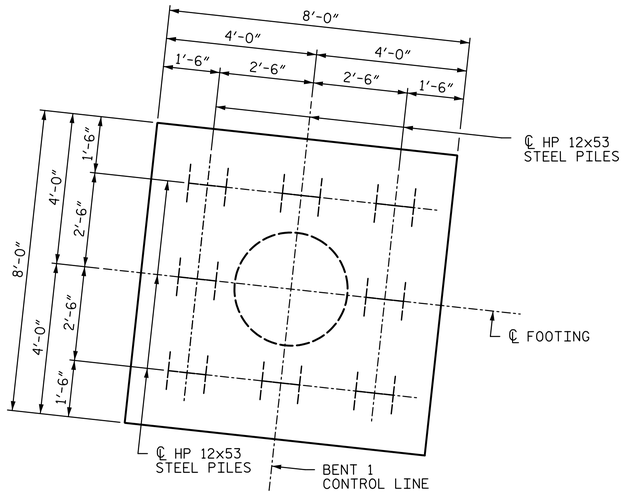
PILE RESTRIKES WILL REQUIRE A MINIMUM OF 25 HAMMER BLOWS OR 1 INCH OF PILE TOP MOVEMENT (WHICHEVER OCCURS FIRST).

PILES DRIVEN PRIOR TO REQUIRED WAITIING PERIOD SHOULD NOT BE INSTALLED TO CUTOFF ELEVATIONS TO ALLOW FOR RESTRIKES TO RELEASE DOWN DRAG LOAD AFTER EMBANKMENT FILL PLACEMENT. FOR PILE ORDERING LENGTHS, PILES SHOULD BE LEFT A MINIMUM OF 1 FOOT ABOVE OF CUTOFF ELEVATION TO ACCOMMODATE RESTRIKES.

AVERAGE ESTIMATED PILE LENGTH BASED ON STATIC ANALYSIS USING SECTION 3.1.1 AND 5.2.2 OF NCDOT LRFD DRIVEN PILE FOUNDATION DESIGN POLICY AND USING A RESISTANCE FACTOR OF .7. ESTIMATED PILE LENGTH INCLUDES 2 FEET FOR CAP/FOOTING EMBEDMENT.

FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF CAP/FOOTING)



DETAIL "A"

LEGEND

H HP 12x53 VERTICAL PILE @ END BENTS AND INTERIOR BENT

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 2 OF 3

DRAWN BY : VKS DATE : 10-18
CHECKED BY : MLO DATE : 10-18
DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34955 TIMOTHY J. TOWNSEND 1/3/2019

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Balfour Beatty Infrastructure Inc. BRANCH CIVIL
A Joint Venture

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-2
1			3			TOTAL SHEETS
2			4			33

DATE: 1/3/2019 TIME: 6:09:00 AM
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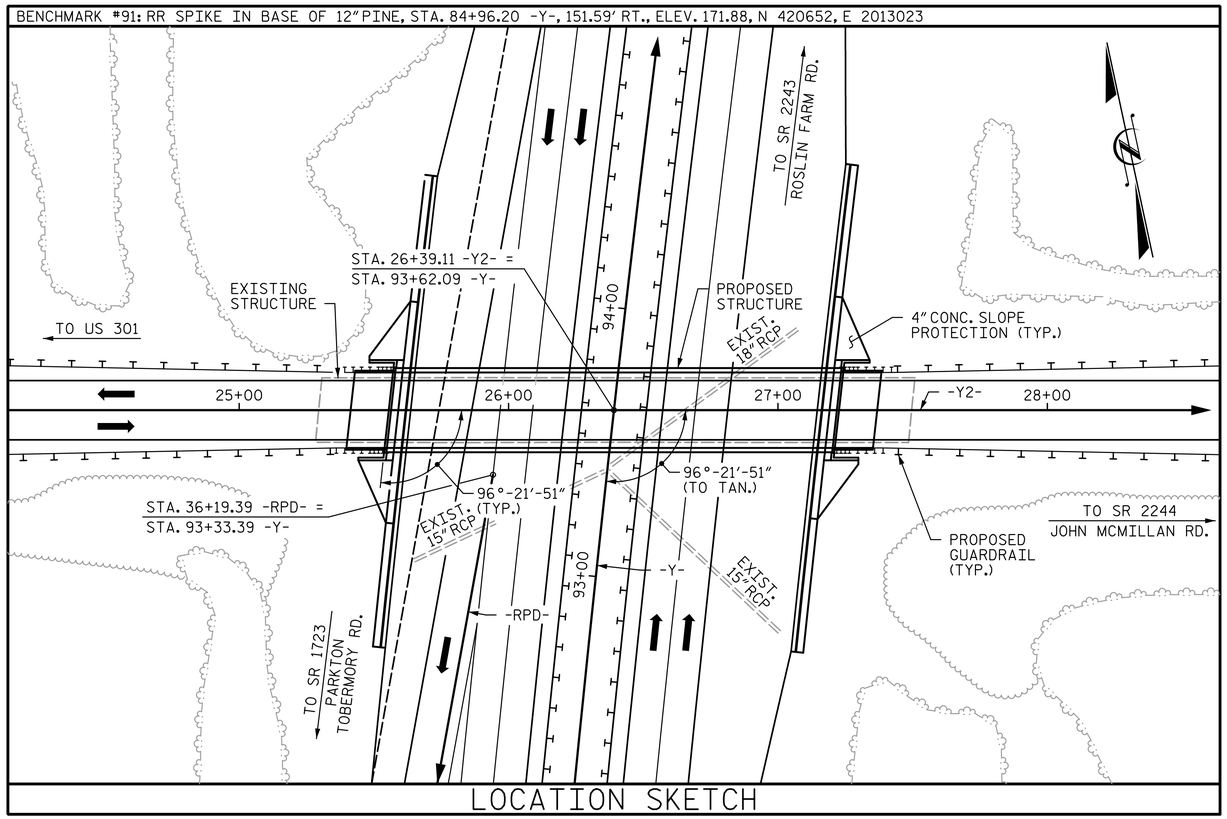

LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR FOUNDATION NOTES, SEE "FOUNDATION LAYOUT" SHEET.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

FOR F.I.B. 45" PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

THE EXISTING STRUCTURE CONSISTING OF 1 @ 55'-3" AND 3 @ 55'-0" SPANS WITH REINFORCED CONCRETE DECK ON PRESTRESSED BEAMS AND PRESTRESSED PRECAST CORED SLABS SUPPORTED BY REINFORCED CONCRETE CAPS AND COLUMNS WITH PRESTRESSED CONCRETE PILES AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING STRUCTURE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

SAMPLE BAR REPLACMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	F.I.B. 45" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIP. SETUP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	MSE RETAINING WALL
	LUMP SUM	EA.	SQ. FT.	SQ. FT.	CU. YD.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	EA.	NO.	LIN. FT.	EA.	LIN. FT.	SQ. YD.	LUMP SUM	SQ. FT.
SUPERSTRUCTURE			5,172	4,829		LUMP SUM			8	655.8					331.0		LUMP SUM	
END BENT 1					27.8		3,549				5	5	400	5		81.6		2,035
BENT 1	LUMP SUM				45.8		7,711	816			16	16	880	8				
END BENT 2					27.8		3,549				5	5	375	5		70.1		2,160
TOTAL	LUMP SUM	2	5,172	4,829	101.4	LUMP SUM	14,809	816	8	655.8	26	26	1,655	18	331.0	151.7	LUMP SUM	4,195

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 3 OF 3

DRAWN BY : VKS DATE : 10-18

CHECKED BY : MLO DATE : 10-18

DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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NORTH CAROLINA PROFESSIONAL SEAL 34955 ENGINEER TIMOTHY J. TOWNSEND 1/3/2019

STV 100 Years

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NC License Number F-0991

Balfour Beatty Infrastructure Inc. BRANCH CIVIL
A Joint Venture

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH, GENERAL NOTES AND TOTAL BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-3
1			3			TOTAL SHEETS
2			4			33

STR. #3

DATE: 1/3/2019 TIME: 6:09:03 AM
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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.86	--	1.75	.71	1.95	B	EL	40.24	.88	2.11	A	I	76.54	0.80	.71	1.86	B	I	40.24	
		HL-93 (OPERATING)	N/A		2.52	--	1.35	.71	2.52	B	EL	40.24	.88	2.75	A	I	76.54	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	2.49	89.64	1.75	.71	2.61	B	EL	40.24	.88	2.90	A	I	76.50	0.80	.71	2.49	B	I	40.24	
		HS-20 (OPERATING)	36.000		3.38	121.68	1.35	.71	3.38	B	EL	40.24	.88	3.76	A	I	76.50	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		5.77	77.90	1.40	.71	7.56	B	EL	40.24	.88	9.10	B	I	5.25	0.80	.71	5.77	B	EL	40.24	
		SNGARBS2	20.000		4.23	84.60	1.40	.71	5.53	B	EL	40.24	.88	6.25	B	I	3.97	0.80	.71	4.23	B	EL	40.24	
		SNAGRIS2	22.000		3.96	87.12	1.40	.71	5.18	A	I	40.24	.88	5.75	B	I	3.97	0.80	.71	3.96	A	I	40.24	
		SNCOTTS3	27.250		2.85	77.66	1.40	.71	3.72	B	EL	40.24	.88	4.47	B	I	5.24	0.80	.71	2.85	B	EL	40.24	
		SNAGGRS4	34.925		2.36	82.42	1.40	.71	3.09	B	EL	40.24	.88	3.63	B	I	3.97	0.80	.71	2.36	B	I	40.24	
		SNS5A	35.550		2.31	82.12	1.40	.71	3.02	B	EL	40.24	.88	3.61	B	I	3.97	0.80	.71	2.31	B	I	40.24	
		SNS6A	39.950		2.11	84.29	1.40	.71	2.76	A	I	40.24	.88	3.28	B	I	3.97	0.80	.71	2.11	A	I	40.24	
		SNS7B	42.000	3	2.01	84.42	1.40	.71	2.63	B	EL	40.24	.88	3.18	B	I	3.97	0.80	.71	2.01	B	I	40.24	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.70	89.10	1.40	.71	3.37	A	ER	40.24	.88	4.11	B	I	3.97	0.80	.71	2.70	A	ER	40.24	
		TNT4A	33.075		2.56	84.67	1.40	.71	3.37	A	ER	40.24	.88	3.86	B	I	3.97	0.80	.71	2.56	A	EL	40.24	
		TNAGRIT4	43.000		2.53	108.79	1.40	.71	2.74	A	ER	40.24	.88	3.34	B	I	3.97	0.80	.71	2.53	B	ER	40.24	
		TNAGT5A	45.000		2.57	115.65	1.40	.71	2.75	A	ER	40.24	.88	3.24	B	I	3.97	0.80	.71	2.57	A	I	40.24	
		TNAGT5B	45.000		2.58	116.10	1.40	.71	2.83	A	ER	40.24	.88	3.14	B	I	3.97	0.80	.71	2.58	A	I	40.24	
		TNT6A	41.600		2.10	87.36	1.40	.71	2.70	A	ER	40.24	.88	3.05	B	I	3.97	0.80	.71	2.10	A	I	40.24	
		TNT7A	42.000		2.10	88.20	1.40	.71	2.56	B	EL	40.24	.88	2.99	B	I	3.97	0.80	.71	2.10	A	I	40.24	
		TNT7B	42.000		2.16	90.72	1.40	.71	2.53	A	ER	40.24	.88	2.93	B	I	3.97	0.80	.71	2.16	A	I	40.24	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

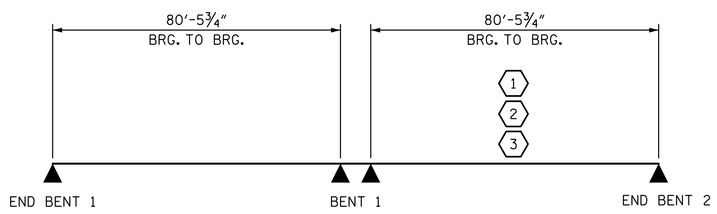
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

DRAWN BY : VKS DATE : 10-18

CHECKED BY : MLO DATE : 10-18

DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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DocuSigned by: NORTH CAROLINA PROFESSIONAL SEAL 34955 ENGINEER TIMOTHY J. TOWNSEND 11/7/2018

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-4
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:13:35 AM
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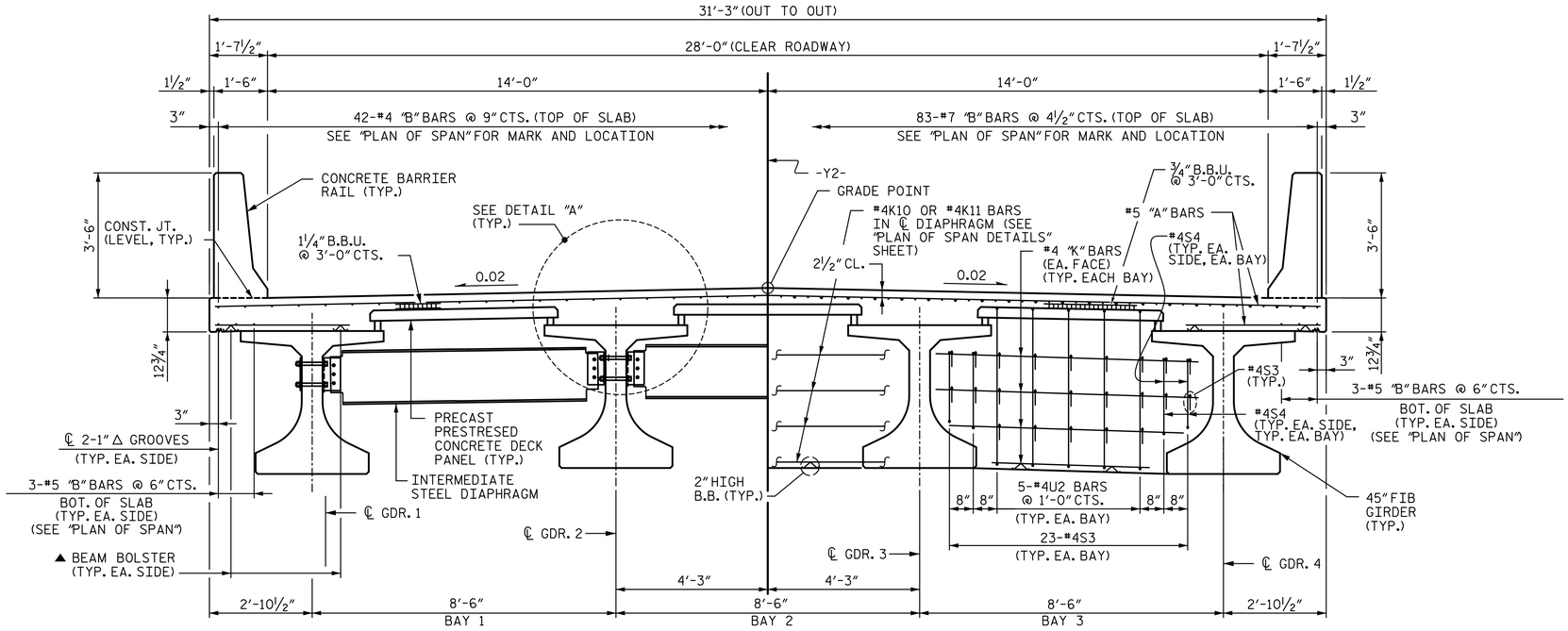
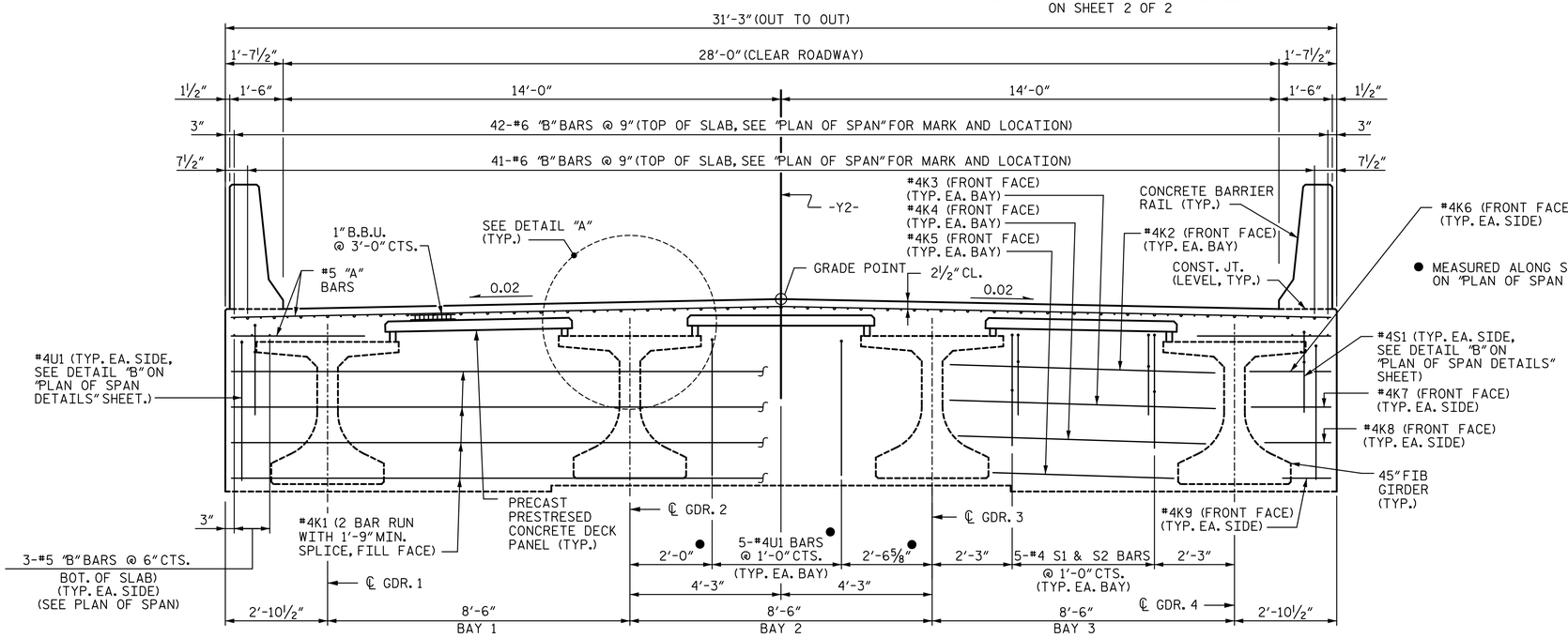


PARTIAL TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM

PARTIAL TYPICAL SECTION AT BENT DIAPHRAGM

ANCHOR ROD NOT SHOWN FOR CLARITY.
SEE ANCHOR ROD EMBEDMENT DETAIL ON SHEET 2 OF 2



ELEVATION OF INTEGRAL END BENT DIAPHRAGM

NOTES:

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTIUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONRETE IS CAST IN THE UNIT.

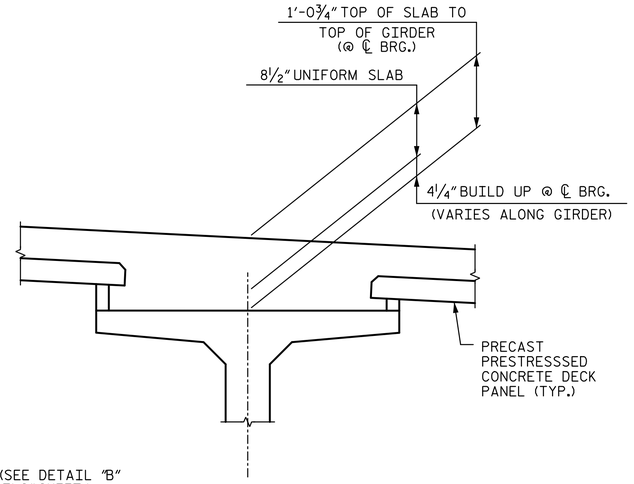
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 45" FIB PRESTRESSED CONCRETE GIRDERS".

FOR BARRIER RAIL DETAILS, SEE "CONCRETE BARRIER RAIL SHEET".

FOR PRECAST PRESTRESSED CONCRETE DECK PANEL AND POLYSTYRENE DETAILS AND NOTES, SEE "PRECAST PRESTRESSED CONCRETE DECK PANELS" SHEET.

▲ BEAM BOLSTER HEIGHTS WILL VARY ALONG THE SPANS WITH THE BUILDUPS. HEIGHTS SHALL BE SET AND ADJUSTED AS NECESARY TO MAINTAIN 2½" CLEAR TO THE TOP & BOTTOM OF THE SLAB.

SEE "BENT 1 SHEET 1 OF 2" FOR ANCHOR ROD LOCATIONS.



DETAIL "A"
(TYP. EA. GIRDER)

● MEASURED ALONG SKEW (SEE DETAIL "B" ON "PLAN OF SPAN DETAILS" SHEET.)

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 1 OF 2

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DEPARTMENT OF TRANSPORTATION
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SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-5
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : VKS	DATE : 9-18	DESIGN ENGINEER OF RECORD: T. TOWNSEND	DATE : 10-18
CHECKED BY : MLO	DATE : 9-18		

DATE: 11/5/2018 TIME: 10:13:37 AM
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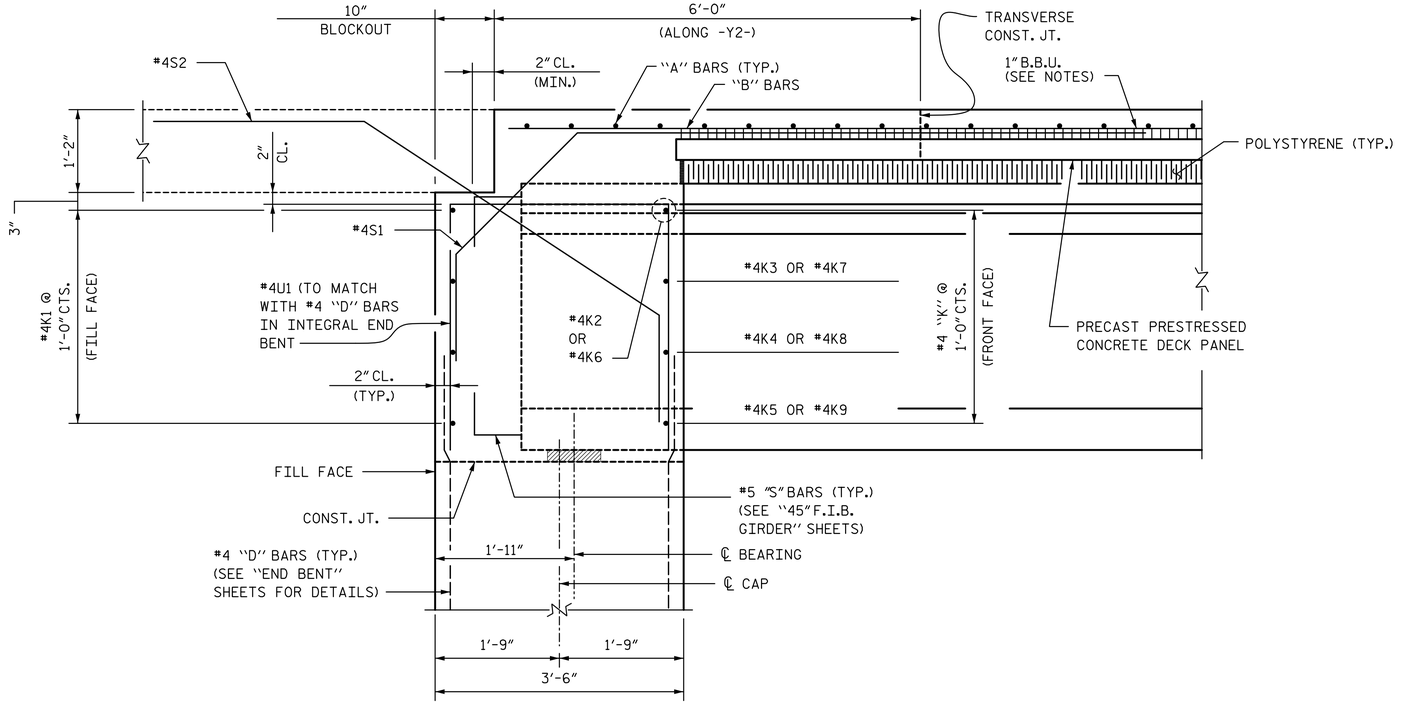
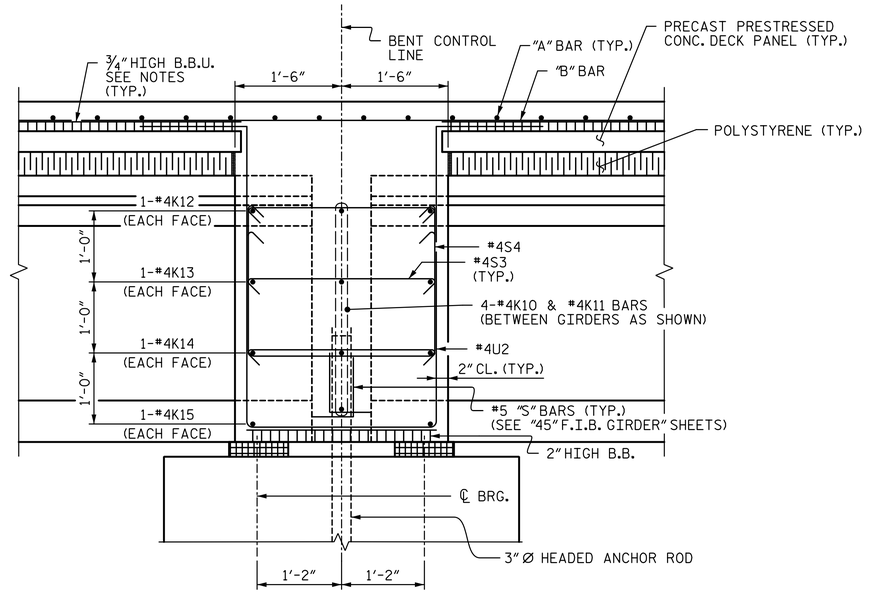
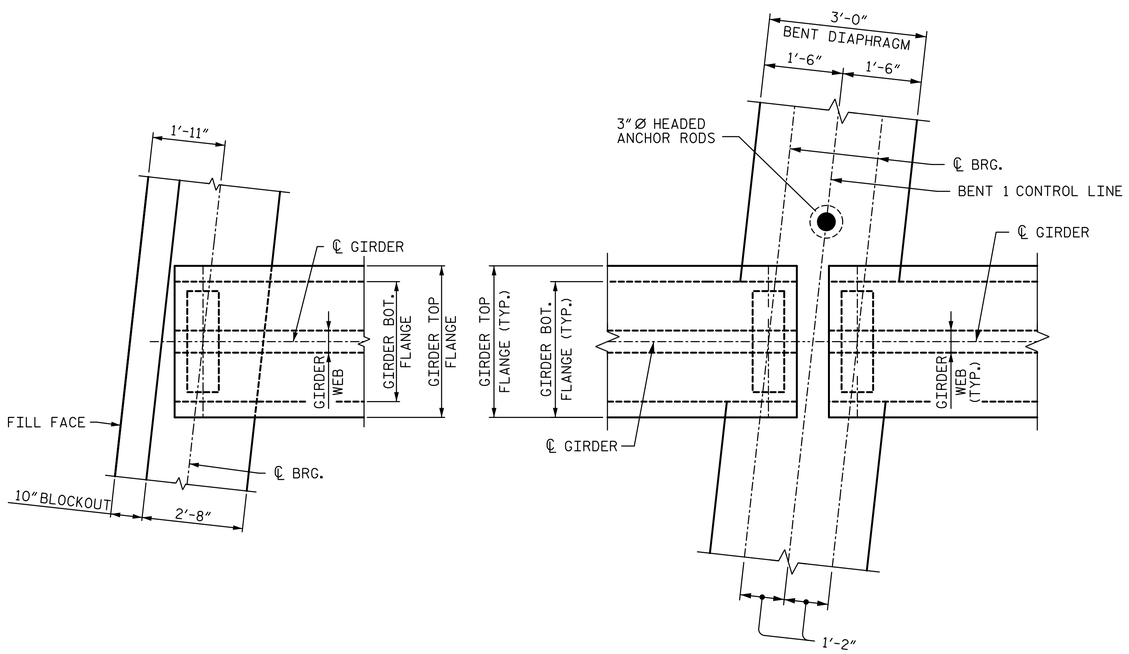


SECTION THRU INTEGRAL END BENT DIAPHRAGM

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



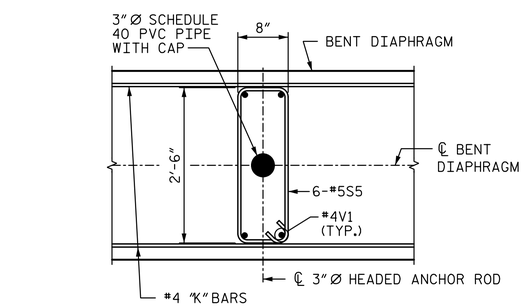
SECTION THRU BENT DIAPHRAGM



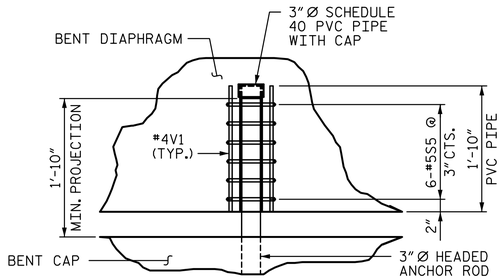
PLAN OF GIRDER AT END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PLAN OF GIRDER AT BENT



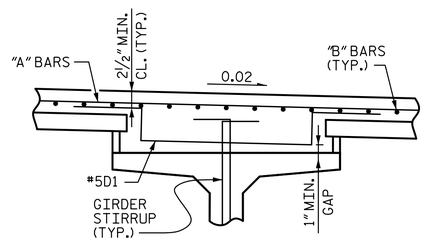
PLAN VIEW



PARTIAL ELEVATION

(DIAPHRAGM REINFORCEMENT NOT SHOWN FOR CLARITY)

ANCHOR ROD EMBEDMENT DETAIL



D1 BAR DETAIL

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 2 OF 2

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11/7/2018

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SUPERSTRUCTURE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-6
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:13:39 AM

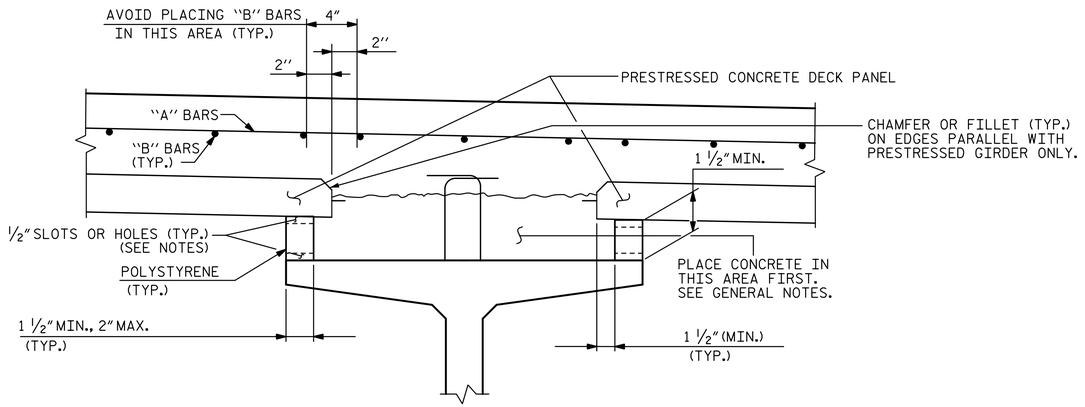
FILE: r:\Structures\Str 3 Y2 over Y\Station\RFC\403.011.U2519.SMU_TS01.006_770515.dgn

DECK PANEL SUPPORTS

THE CONTRACTOR SHALL PROVIDE THE DECK PANEL SUPPORT SYSTEM SHOWN OR HE MAY SUBMIT A DECK PANEL SUPPORT SYSTEM OF HIS OWN DESIGN TO THE ENGINEER FOR APPROVAL.

POLYSTYRENE SUPPORT SYSTEM

1. ALL POLYSTYRENE SHALL BE DOW STYROFOAM 60 HIGH-LOAD, UC INDUSTRIES FOAMULAR 600 OR APPROVED EQUAL.
2. THE POLYSTYRENE SUPPORT SYSTEM SHALL CONSIST OF ONE LAYER WITH A MINIMUM WIDTH OF 1½" AND A MAXIMUM WIDTH OF 2". THE POLYSTYRENE SHALL HAVE ½" X ½" WIDE SLOTS OR ½" DIAMETER HOLES AT 4'-0" CENTERS STAGGERED ALONG THE TOP AND BOTTOM.
3. THE POLYSTYRENE MAY BE CUT AND PLACED ON EDGE AS NECESSARY TO MATCH THE REQUIRED BUILDUP PROFILE ALONG THE GIRDER.
4. ADHESIVE, AS APPROVED BY THE ENGINEER, SHALL BE APPLIED TO THE TOP OF THE GIRDER IN A CONTINUOUS BEAD AND IN SUFFICIENT AMOUNT TO PREVENT THE POLYSTYRENE FROM BLOWING OUT AND TO PREVENT GAPS FROM FORMING BETWEEN THE POLYSTYRENE AND THE GIRDER. PRIOR TO PLACEMENT OF THE DECK PANELS, THE ADHESIVE SHALL ALSO BE APPLIED TO THE TOP OF THE POLYSTYRENE.
5. CONCRETE-FILLED BUCKETS, STACKS OF DECK PANELS, BUNDLED REINFORCING BARS OR OTHER HEAVY CONCENTRATED LOADS WILL NOT BE PERMITTED ON THE DECK PANEL ONCE THE PANEL HAS BEEN PLACED ON THE POLYSTYRENE SUPPORT SYSTEM.



POLYSTYRENE SUPPORT

GENERAL NOTES

1. THE DESIGN COMPRESSIVE STRENGTH (f'c) FOR THE CONCRETE IN PRESTRESSED PANELS SHALL BE 5000 PSI MINIMUM AT 28 DAYS. COMPRESSIVE STRENGTH OF CONCRETE AT TIME OF RELEASE OF STRANDS SHALL BE 4000 PSI MINIMUM.
2. THE PRECAST PRESTRESSED PANEL SHALL HAVE A THICKNESS OF 3 ½" WITH THE PRESTRESSED STRANDS LOCATED AT HALF THE DEPTH OF THE PANEL.
3. FOR SKEWED SPANS, TRAPEZOIDAL CLOSURE PANELS SHALL HAVE A MINIMUM WIDTH OF 2 FEET ON THE SHORT SIDE.
4. ALL PRESTRESSING STRANDS SHALL EXTEND 2" BEYOND THE PANEL EDGES.
5. SHEAR REINFORCING OF 0.60 SQ. INCHES OF REINFORCING STEEL PER 10 SQ. FEET OF PANEL SURFACE SHALL BE PROVIDED IN THE PANEL TO ENSURE COMPOSITE ACTION BETWEEN PANEL AND THE CAST-IN-PLACE CONCRETE. SHEAR REINFORCEMENT SHALL BE MADE OF WELDED WIRE HAVING A MINIMUM YIELD STRENGTH OF 60 KSI.
6. SHEAR REINFORCEMENT AND LIFTING DEVICES SHALL BE CONSTRUCTED AND PLACED SO AS TO AVOID ANY INTERFERENCE WITH REINFORCING STEEL IN THE CAST-IN-PLACE DECK SLAB AND TO ALLOW FOR PROPER CONCRETE CONSOLIDATION IN THE DECK PANEL.
7. SHIFT LONGITUDINAL "B" BARS AS NECESSARY TO OBTAIN A MINIMUM CLEAR DISTANCE OF 2" TO THE RIGHT OR LEFT OF THE EDGE OF THE DECK PANEL.
8. WHEN CASTING THE DECK, PLACE CONCRETE FIRST OVER THE GIRDERS IN CONTINUOUS STRIPS A MINIMUM OF THREE PANEL LENGTHS AHEAD OF THE REST OF THE CONCRETE. CAREFULLY VIBRATE THE CONCRETE OVER THE GIRDERS SO THAT CONCRETE COMPLETELY FILLS THE AREA UNDER THE DECK PANEL OVERHANGS. THEN PLACE AND VIBRATE THE REMAINING DECK CONCRETE.

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

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11/7/2018

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SUPERSTRUCTURE

PRECAST PRESTRESSED CONCRETE DECK PANEL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-7
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : VKS	DATE : 7-18	DESIGN ENGINEER OF RECORD: T. TOWNSEND	DATE : 10-18
CHECKED BY : MLO	DATE : 9-18		

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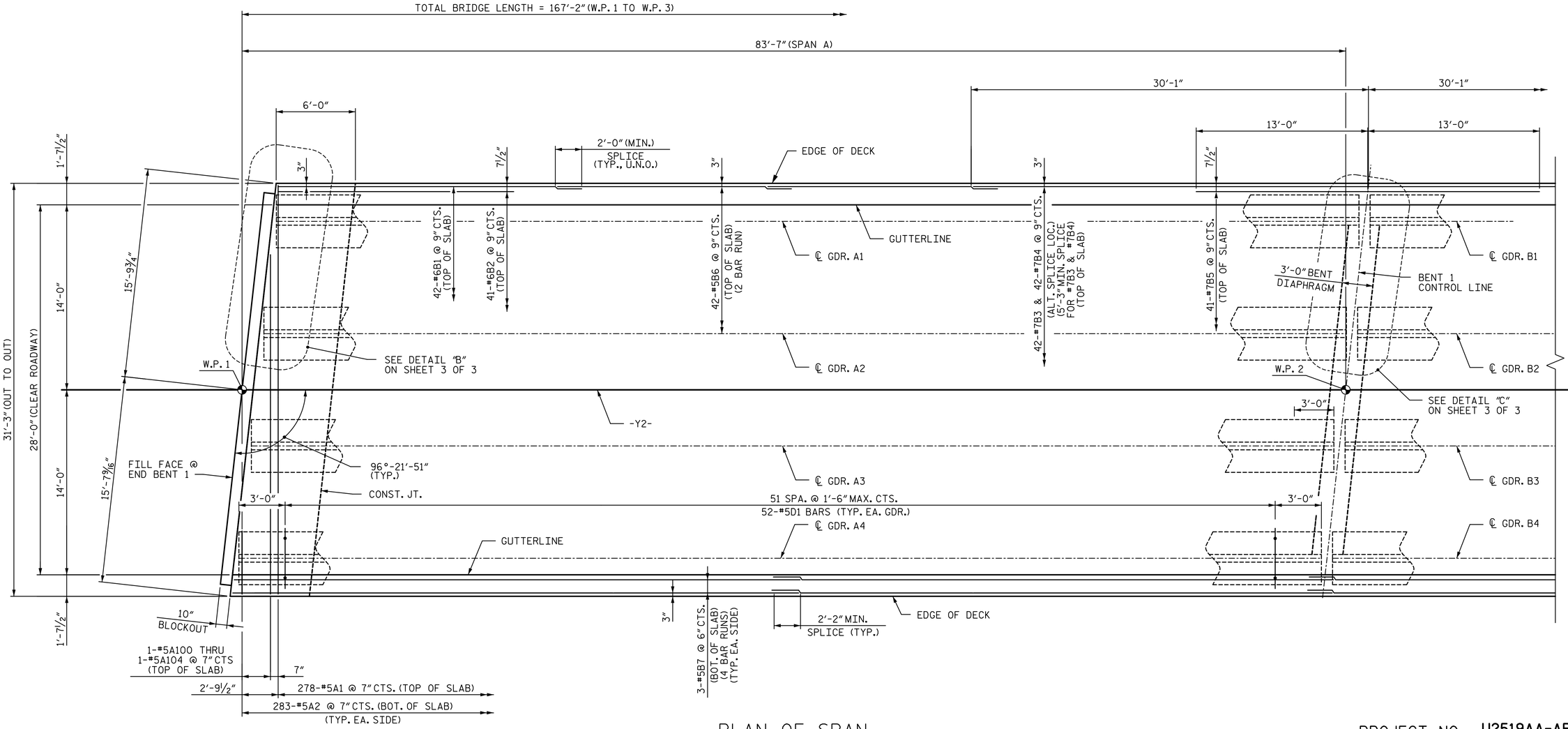

PLAN OF SPAN

NOTES:

1. FOR CONCRETE BARRIER RAIL DIMENSIONS, REINFORCEMENT AND JOINT SPACING, SEE "CONCRETE BARRIER RAIL" SHEET.
2. FOR POUR SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB, SEE "DECK POUR SEQUENCE" SHEET.
3. FOR SECTION VIEWS AND D1 BAR DETAIL, SEE "SUPERSTRUCTURE DETAILS" SHEET.
4. FOR "B" BAR SPACING AND LOCATION, SEE "TYPICAL SECTION" SHEET.
5. FOR MINIMUM SPLICE LENGTHS, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.
6. FOR ADDITIONAL DETAILS, SEE SHEET 3 OF 3.

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 1 OF 3

DRAWN BY : VKS DATE : 9-18

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DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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SUPERSTRUCTURE

PLAN OF SPAN
SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-8
1			3			TOTAL SHEETS
2			4			33

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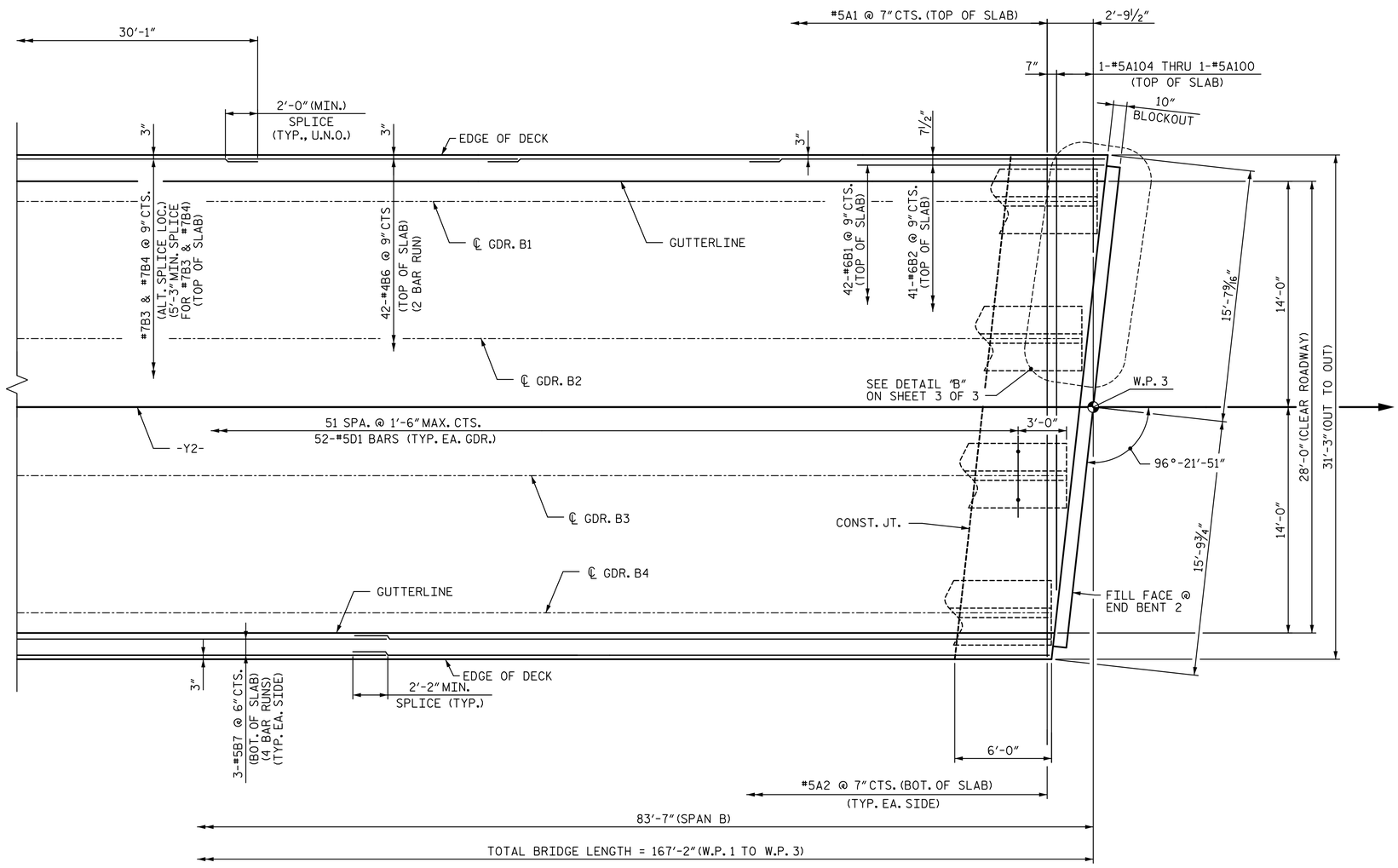

NOTES:

1. FOR NOTES, SEE SHEET 1 OF 3

PLAN OF SPAN

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 2 OF 3

DRAWN BY : VKS DATE : 9-18

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DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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SUPERSTRUCTURE

PLAN OF SPAN
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-9
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:13:45 AM
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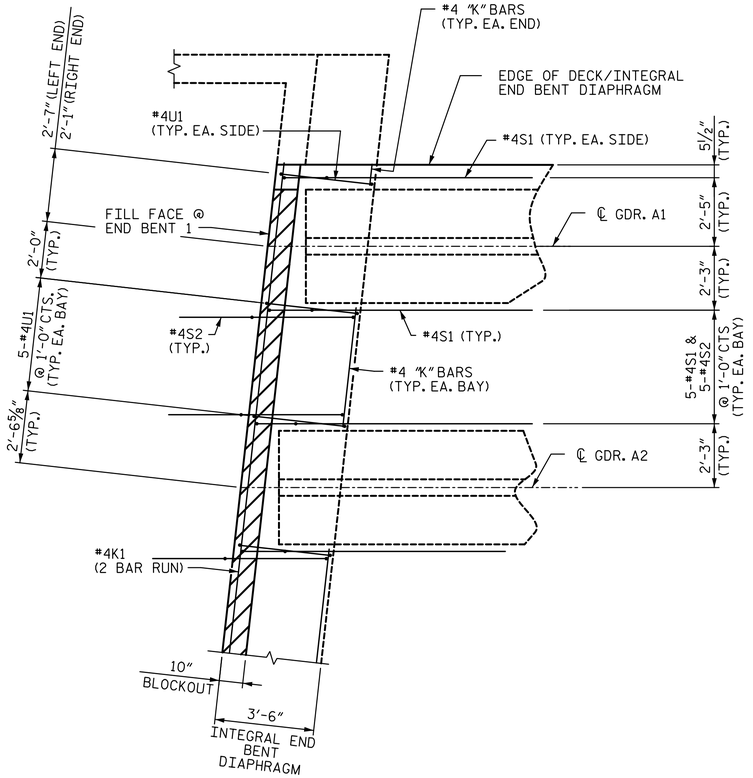
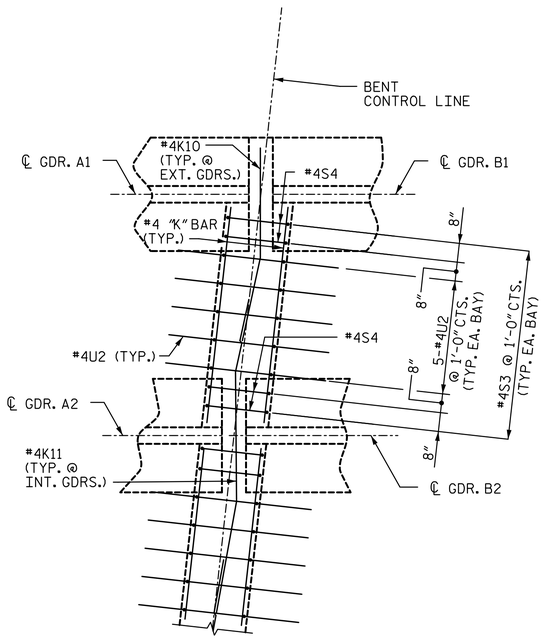


DETAIL "B"
(END BENT 1 SHOWN, END BENT 2 SIMILAR.)



DETAIL "C"

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 3 OF 3

DRAWN BY : VKS DATE : 9-18
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DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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SUPERSTRUCTURE

PLAN OF SPAN DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-10
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:13:47 AM
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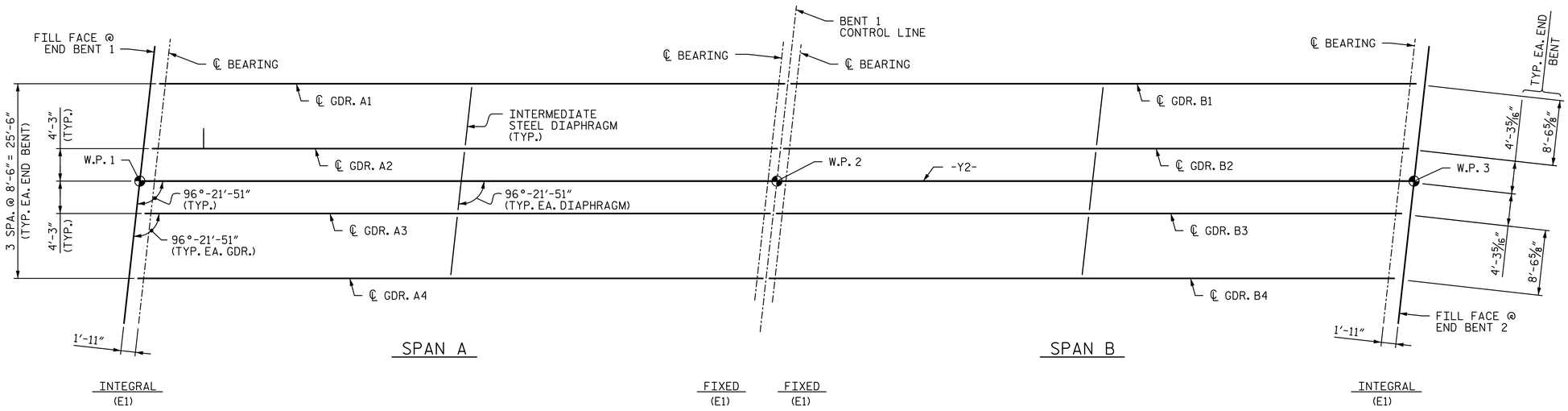

FRAMING PLAN

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR FIB 45" PRESTRESSED CONCRETE GIRDERS" SHEET.

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

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1/3/2019

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SUPERSTRUCTURE

FRAMING PLAN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-11
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : VKS	DATE : 9-18	DESIGN ENGINEER OF RECORD: T. TOWNSEND	DATE : 10-18
CHECKED BY : MLO	DATE : 9-18		

DATE: 1/3/2019 TIME: 6:09:05 AM
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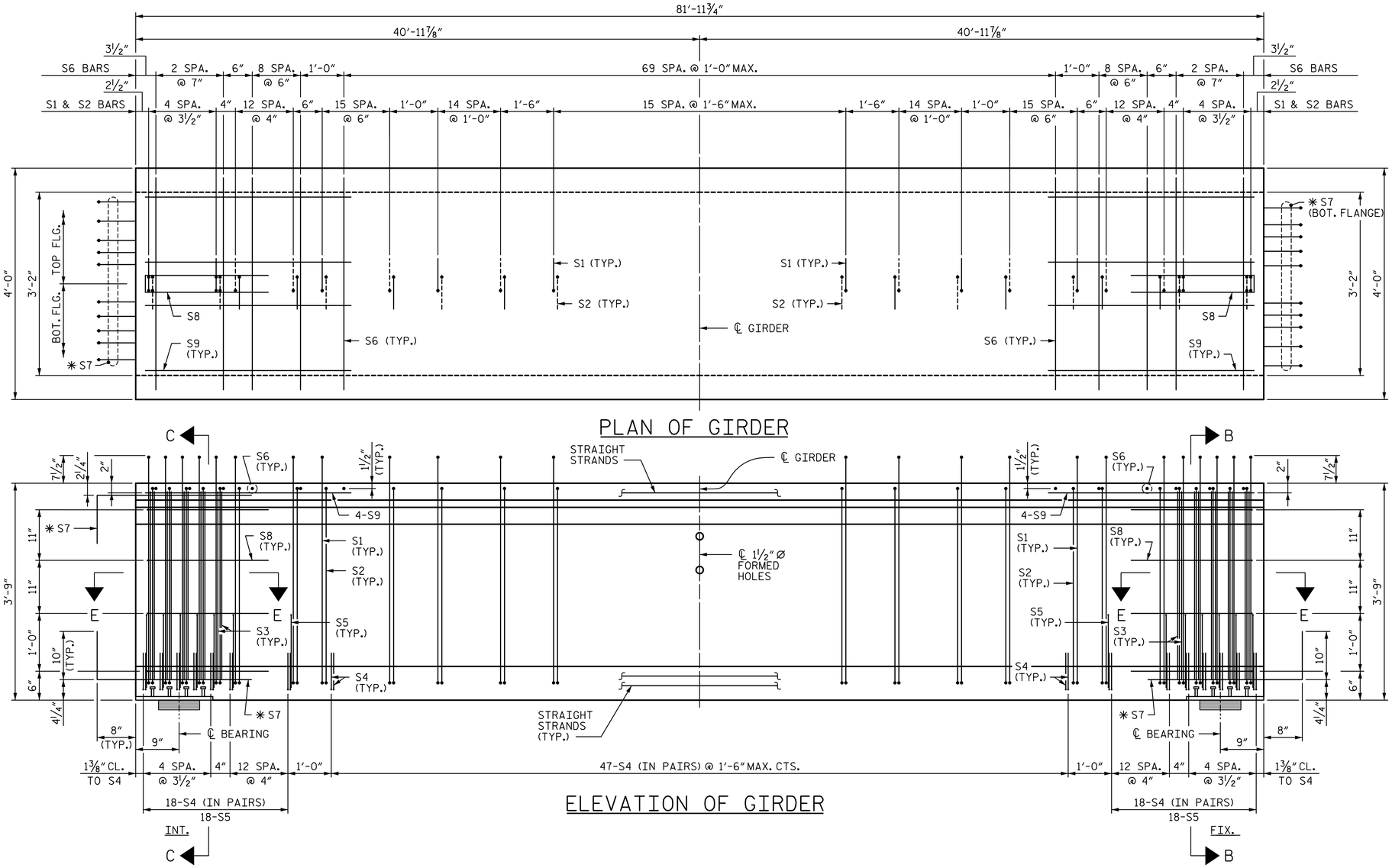
NOTES

FOR SECTIONS AND DETAILS, SEE SHEET 2 OF 3 AND 3 OF 3.

FOR ADDITIONAL NOTES, SEE SHEET 3 OF 3.

ALTERNATE DIRECTION OF #5S1 AND #5S2 BARS.



PLAN OF GIRDER

ELEVATION OF GIRDER

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 1 OF 3

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SUPERSTRUCTURE

F.I.B. 45″ PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-12
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : VKS	DATE : 8-18	DESIGN ENGINEER OF RECORD: T. TOWNSEND	DATE : 10-18
CHECKED BY : MLO	DATE : 10-18		

DATE: 11/5/2018 TIME: 10:13:51 AM
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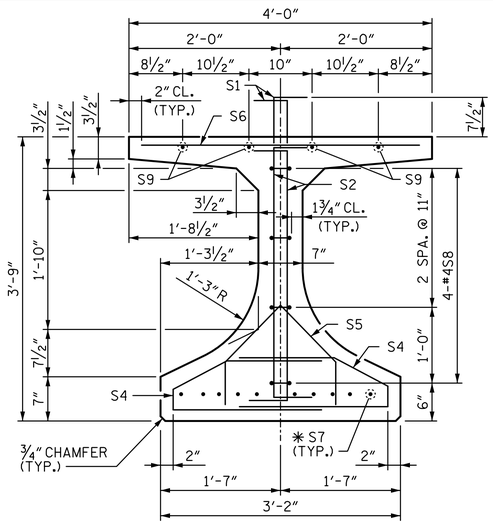
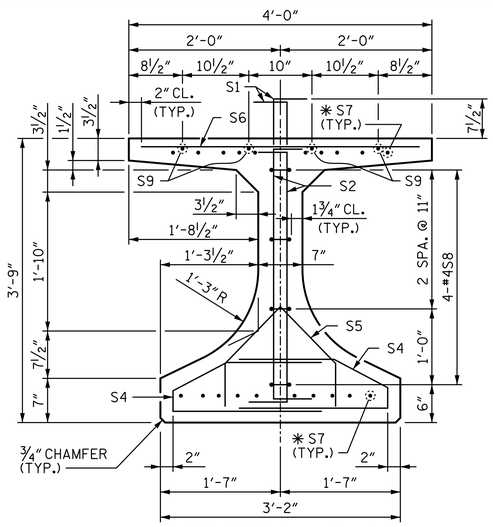


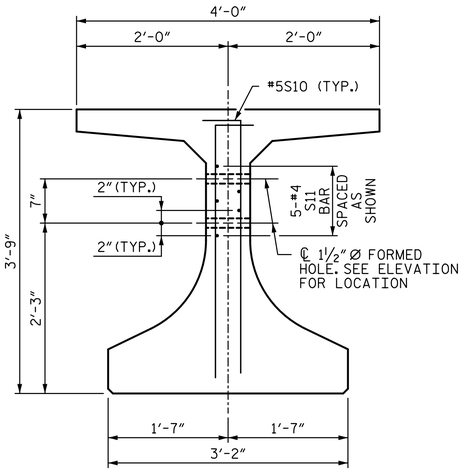
SECTION B-B

(S3 BAR NOT SHOWN FOR CLARITY)

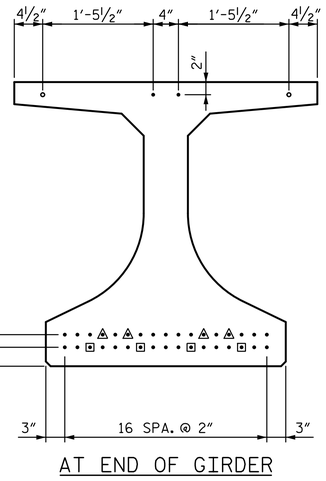


SECTION C-C

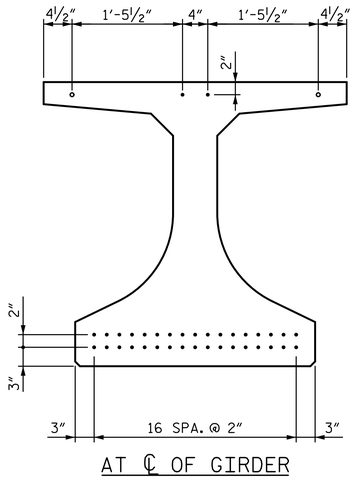
(S3 BAR NOT SHOWN FOR CLARITY)



SECTION D-D



AT END OF GIRDER



AT ℄ OF GIRDER

0.6″Ø LOW RELAXATION STRAND LAYOUT

(38 - 0.6″Ø STRANDS REQUIRED)

DEBONDING LEGEND

- • - FULLY BONDED STRANDS
- ∘ - STRANDS PULLED TO 4,500 LBS.
- ◬ - DEBONDED FOR 4′-0″ FROM END OF GIRDER
- ⊡ - DEBONDED FOR 6′-0″ FROM END OF GIRDER

PARTIAL ELEVATION

(SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER NOS. 1 THROUGH 4)

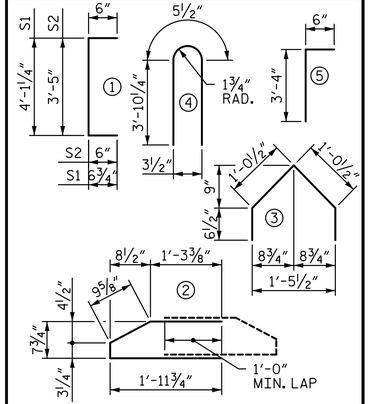
0.6″Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR.

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	114	#5	1	5′-2″	614
S2	114	#5	1	4′-5″	525
S3	20	#5	STR	3′-3″	68
S4	166	#3	2	4′-4″	270
S5	36	#3	3	3′-2″	43
S6	94	#4	STR	3′-8″	230
✳ S7	30	#5	STR	3′-8″	115
S8	8	#4	4	8′-2″	44
S9	8	#5	STR	10′-0″	83
S10	8	#5	5	3′-10″	32
S11	5	#4	STR	8′-0″	27

✳ NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	6,500 PSI CONCRETE	0.6″Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDER	2,051	18.3	38

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	81′-11¾″	655′-10″

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 2 OF 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 34955 ENGINEER TIMOTHY A. TOWNSEND

11/7/2018

STV 100 Years

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Balfour Beatty Infrastructure Inc. BRANCH CIVIL
A Joint Venture

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 45″
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPANS "A" AND "B"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-13
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : VKS	DATE : 9-18	DESIGN ENGINEER OF RECORD: T. TOWNSEND	DATE : 10-18
CHECKED BY : MLO	DATE : 9-18		

DATE: 11/5/2018 TIME: 10:13:53 AM
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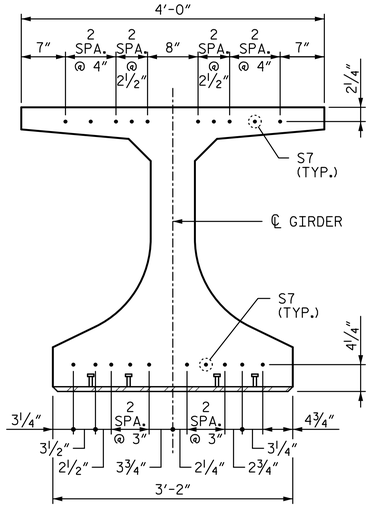
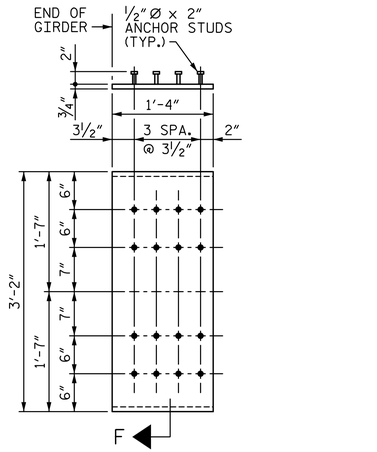


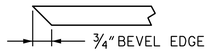
DETAIL ″C″

(GIRDER END AT INTEGRAL END BENTS SHOWN, FOR GIRDER END AT BENT OMIT S7 BARS IN TOP FLANGE.)



EMBEDDED PLATE ″B-1″ DETAILS

(2 REQ′D PER GIRDER)



SECTION ″F″

(SEE NOTES)

NOTES:

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

TIE BARS S1 AND S2 TO THE FULLY BONDED STRANDS IN THE BOTTOM OR CENTER ROW.

AT THE CONTRACTOR′S OPTION, THE LENGTH OF THE BOTTOM LEGS OF BARS S1 AND S2 MAY BE EXTENDED TO FACILITATE TYING TO THE EXTERIOR STRANDS.

S4 BARS MAY BE FABRICATED AS A SINGLE BAR WITH A 1′-0″ MINIMUM LAP SPLICE OF THE TOP LEGS, OR THE LENGTH OF THE BOTTOM LEGS MAY BE EXTENDED TO FACILITATE TYING TO THE EXTERIOR STRANDS.

EMBEDDED PLATE ″B-1″ SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

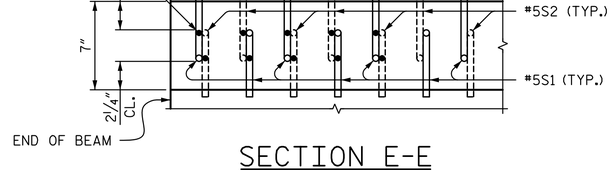
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE ″B″ REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2″ BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5,200 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4″, SHALL BE RAKED TO A DEPTH OF ¼″.



SECTION E-E

DEAD LOAD DEFLECTION TABLE FOR SPANS A AND B											
	GIRDERS 1 - 4										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.056	0.106	0.146	0.170	0.179	0.170	0.146	0.106	0.056	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.023	0.046	.064	0.075	0.079	0.075	.064	0.046	0.023	0.000
FINAL CAMBER ↑	0″	3/8″	3/4″	1″	1 1/8″	1 3/16″	1 1/8″	1″	3/4″	3/8″	0″

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 3 OF 3

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Docusigned by: TIMOTHY J. TOWNSEND — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34955 — 11/7/2018

STV 100 Years

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Charlotte, NC 28202
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 45″ PRESTRESSED CONCRETE GIRDER DETAILS & DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-14
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : VKS DATE : 9-18
CHECKED BY : MLO DATE : 9-18

DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

DATE: 11/5/2018 TIME: 10:13:55 AM
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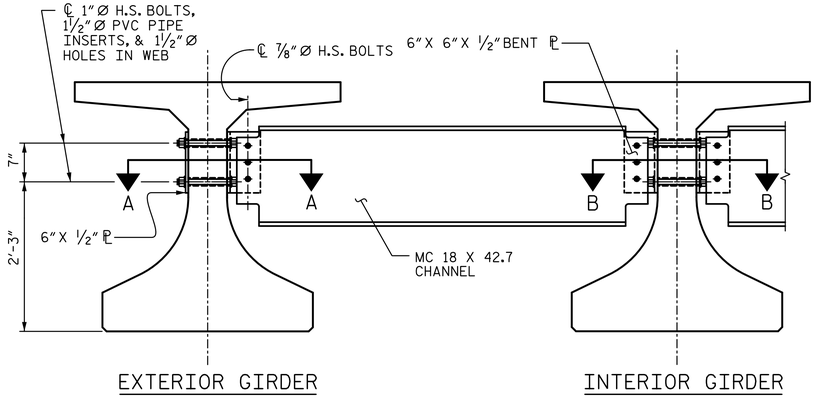
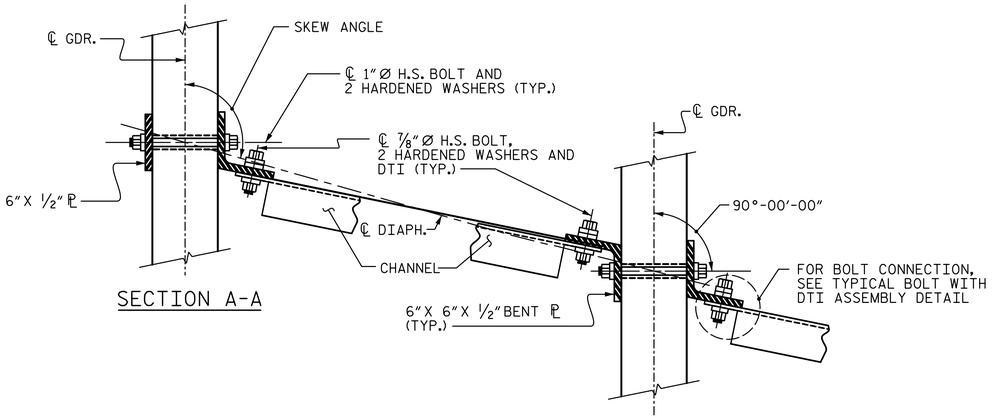
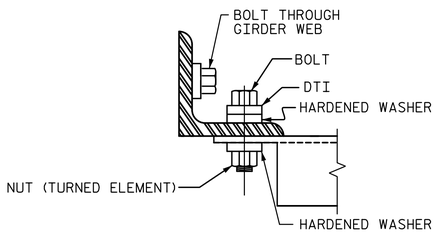


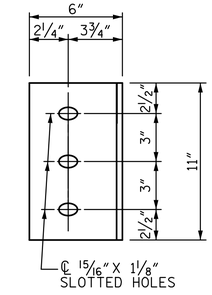
PART SECTION AT INTERMEDIATE DIAPHRAGM



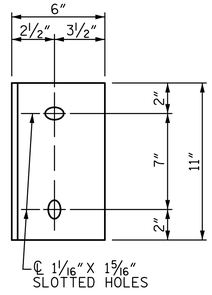
CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL



DIAPHRAGM FACE



WEB FACE

CONNECTION PLATE DETAILS

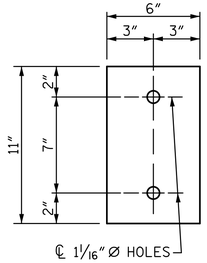
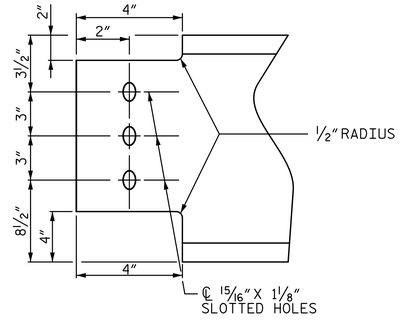


PLATE DETAILS



CHANNEL END

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

DRAWN BY : VKS	DATE : 10-18	DESIGN ENGINEER OF RECORD: T. TOWNSEND	DATE : 10-18
CHECKED BY : MLO	DATE : 10-18		

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NORTH CAROLINA PROFESSIONAL SEAL 34955 ENGINEER TIMOTHY J. TOWNSEND
11/7/2018

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A Joint Venture

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

INTERMEDIATE STEEL DIAPHRAGMS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-15
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:13:57 AM
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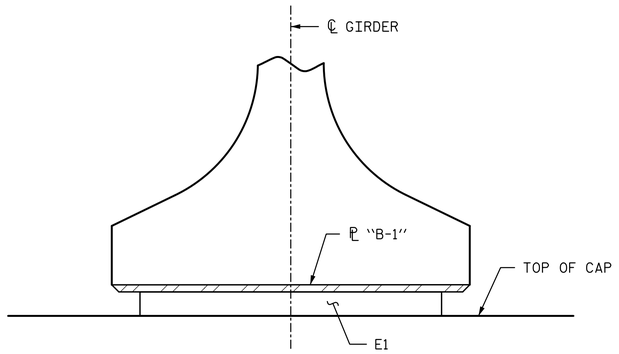
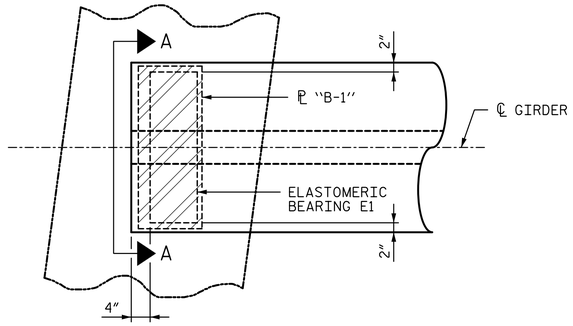


SECTION A-A



PLAN VIEW
(END BENT 1 SHOWN, END BENT 2 & BENT 1 SIMILAR)

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
E1	480 k

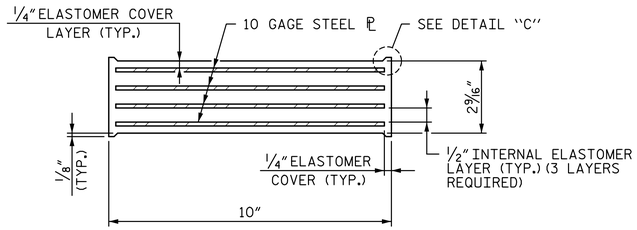
NOTES

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.150 KSI, IN ACCORDANCE WITH AASHTO M251.

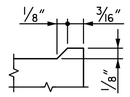
STEEL PLATES IN BEARING PADS SHALL CONFORM TO ASTM A1011 GRADE 36, TYPE 1.

FABRICATOR MAY PROVIDE A 1½° MOLD DRAFT ALONG THE PERIMETER OF THE BEARING.

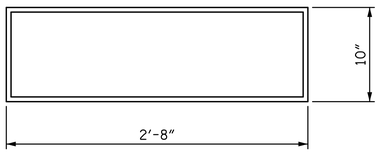
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.



TYPICAL SECTION OF ELASTOMERIC BEARINGS



DETAIL "C"



E1 (16 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING

ELASTOMERIC BEARING

PROJECT NO. U2519AA-AB
CUMBERLAND/ROBESON COUNTY
STATION: 26+39.11 -Y2-

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DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
ELASTOMERIC BEARING DETAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-16
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : VKS	DATE : 8-18	DESIGN ENGINEER OF RECORD: T. TOWNSEND	DATE : 10-18
CHECKED BY : MLO	DATE : 10-18		

DATE: 11/5/2018 TIME: 10:13:59 AM
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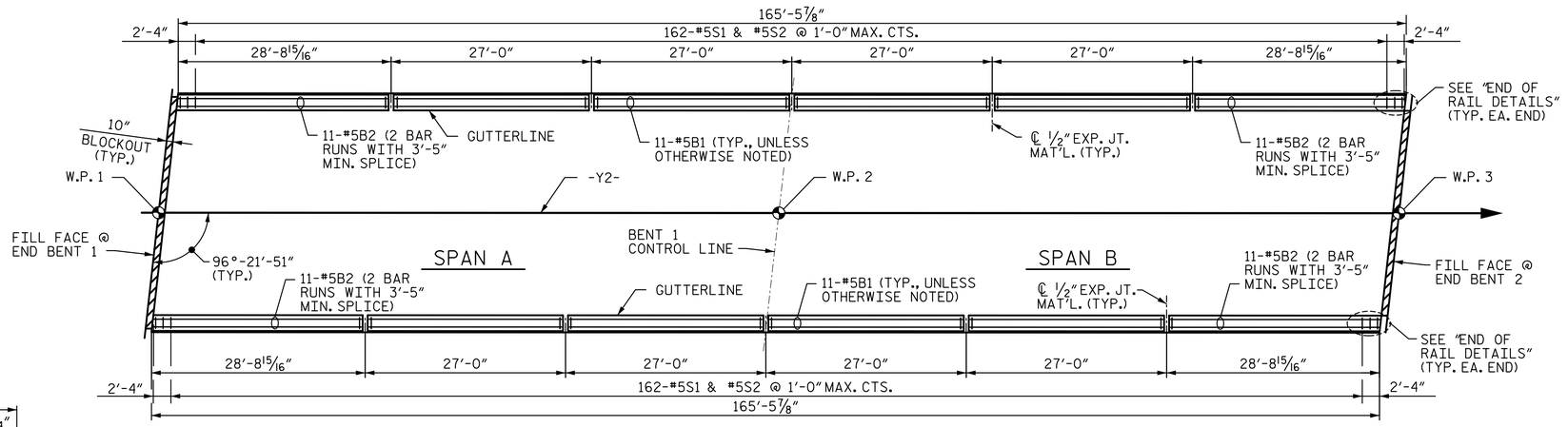
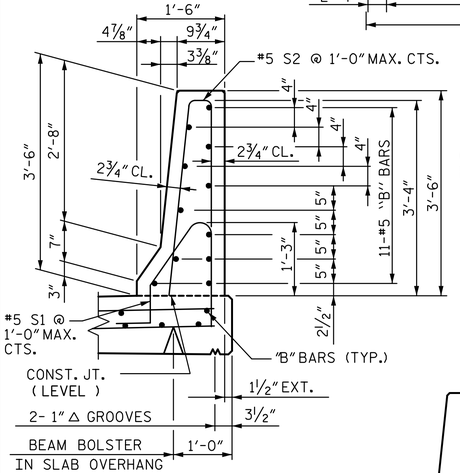
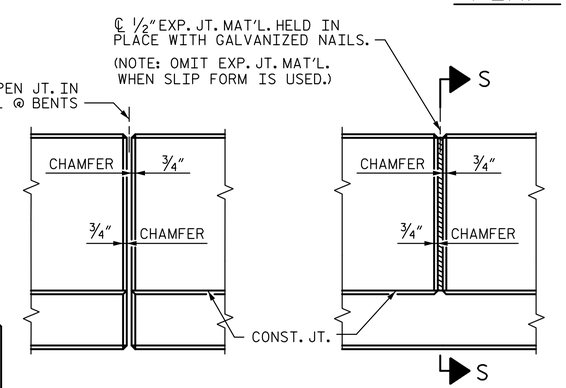


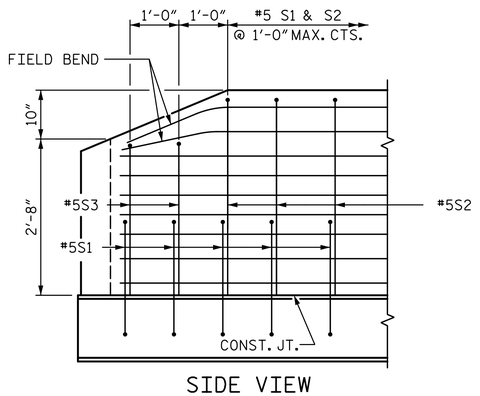
PLAN



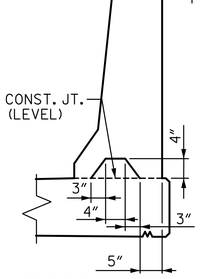
SECTION THRU RAIL



ELEVATION AT EXPANSION JOINTS

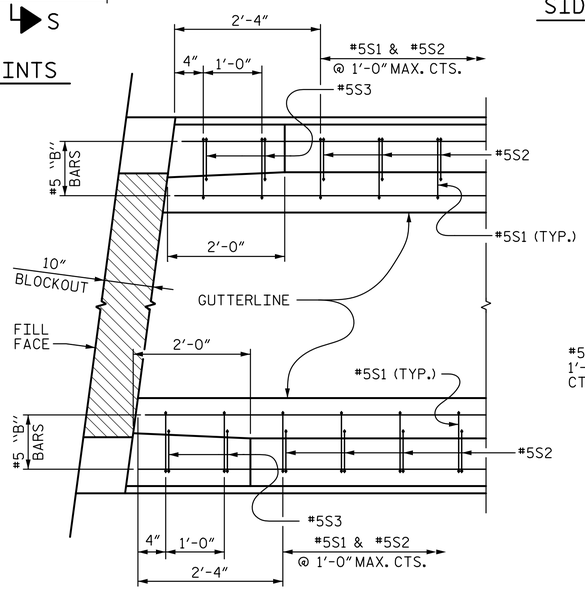


SIDE VIEW

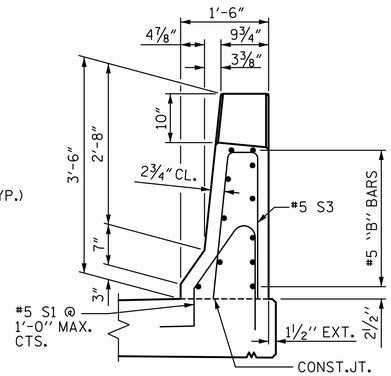


SECTION S-S

AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

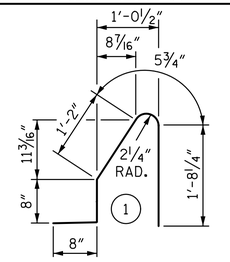


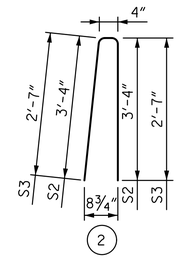
PLAN



END VIEW

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	88	#5	STR	26'-6"	2,432
✳B2	88	#5	STR	16'-1"	1,476
✳S1	332	#5	1	4'-8"	1,616
✳S2	324	#5	2	7'-0"	2,366
✳S3	8	#5	2	5'-6"	46

✳ EPOXY COATED REINFORCING STEEL	7,936	LBS.
CLASS AA CONCRETE	45.0	CU. YDS.
CONCRETE BARRIER RAIL SUPERSTRUCTURE	331.0	LIN. FT.

BARRIER RAIL DETAILS

NOTES:

THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

END OF RAIL DETAILS

(BEGIN BRIDGE SHOWN, END BRIDGE SIMILAR)

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

DRAWN BY : VKS DATE : 9-18

CHECKED BY : MLO DATE : 9-18

DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34955 TIMOTHY J. TOWNSEND

11/7/2018

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-17
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:14:01 AM
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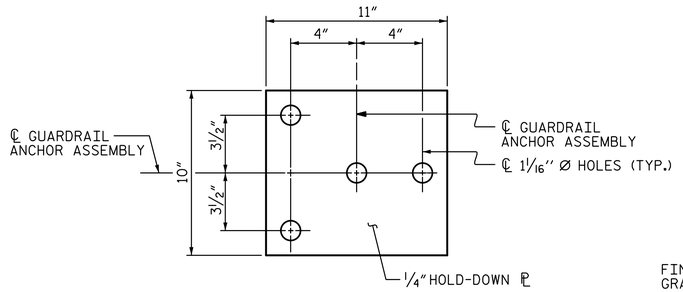
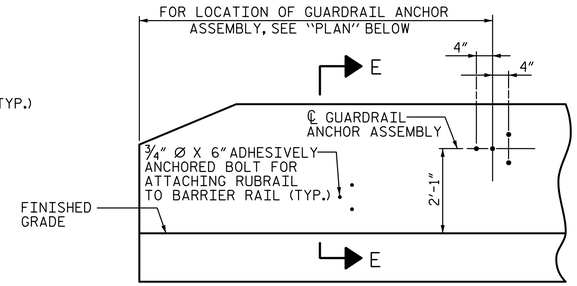


PLAN



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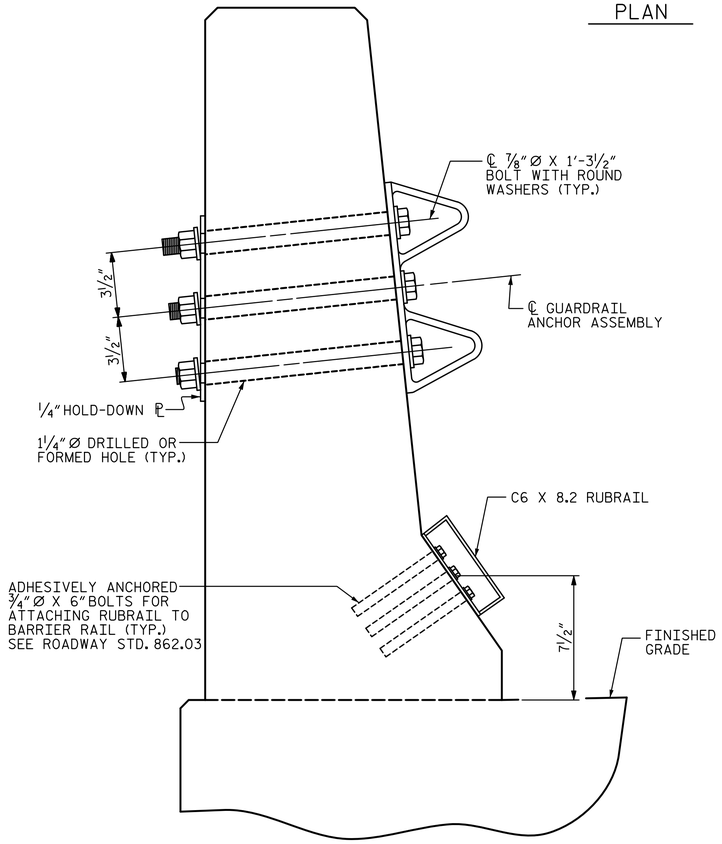
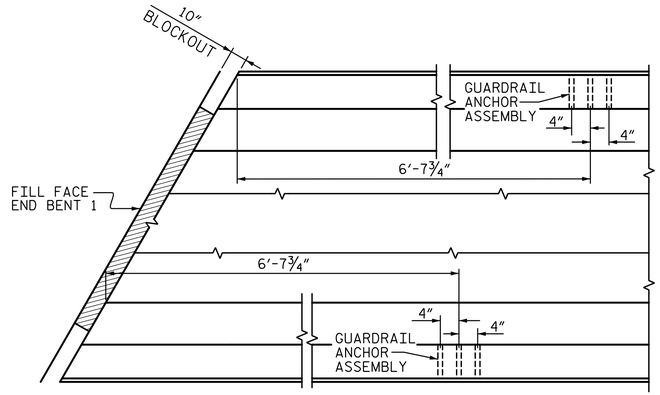


SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.

NOTES:

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼″ HOLD-DOWN PLATE AND 4 - ⅞″ Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞″ Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

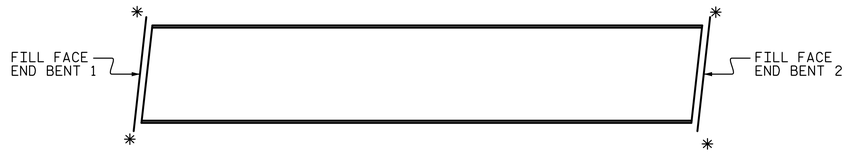
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

THE 1 ¼″ Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE ¾″ Ø X 6″ BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾″ Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

DRAWN BY : VKS DATE : 9-18

CHECKED BY : MLO DATE : 9-18

DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34955 TIMOTHY J. TOWNSEND

11/7/2018

STV 100 Years

STV ENGINEERS, INC.
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Balfour Beatty Infrastructure Inc. BRANCH CIVIL
A Joint Venture

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-18
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:14:03 AM
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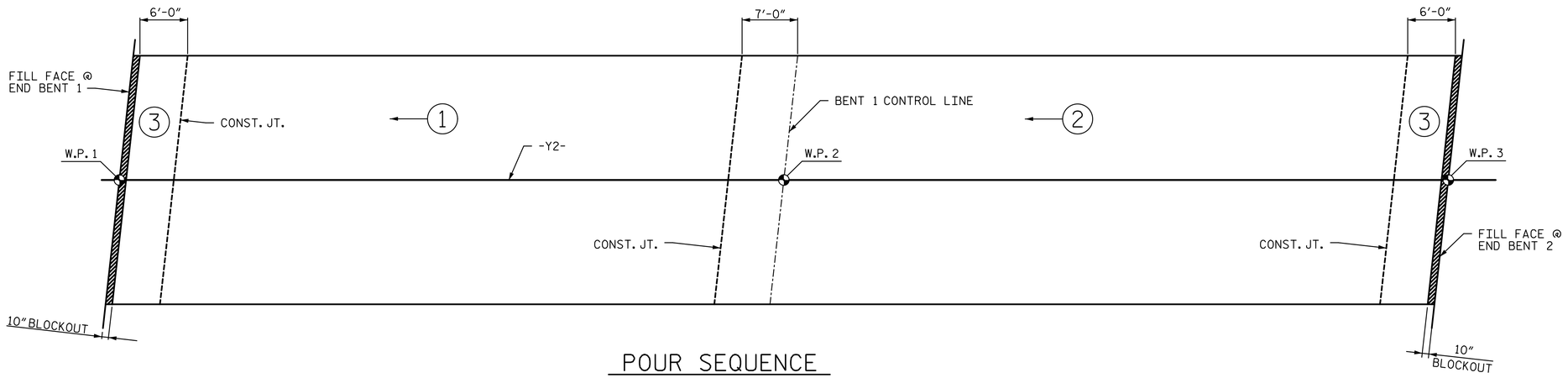
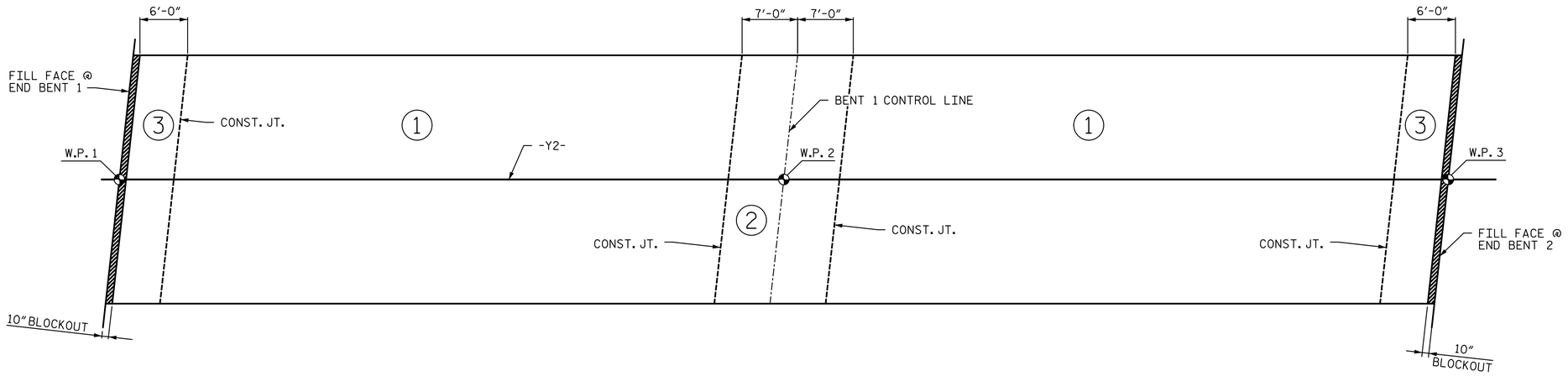


POUR SEQUENCE

← (#) = INDICATES POUR NUMBER AND DIRECTION OF POUR



OPTIONAL POUR SEQUENCE

← (#) = INDICATES POUR NUMBER AND DIRECTION OF POUR

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

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SUPERSTRUCTURE

DECK POUR SEQUENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-19
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : VKS	DATE : 9-18	DESIGN ENGINEER OF RECORD: T. TOWNSEND	DATE : 10-18
CHECKED BY : MLO	DATE : 9-18		

DATE: 11/5/2018 TIME: 10:14:05 AM
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SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2′-0″	1′-9″	2′-0″	1′-9″	2′-9″
#5	2′-6″	2′-2″	2′-6″	2′-2″	3′-5″
#6	3′-0″	2′-7″	3′-10″	2′-7″	4′-4″
#7	5′-3″	3′-6″			
#8	6′-10″	4′-7″			

GROOVING BRIDGE FLOORS

APPROACH SLABS	700 SQ.FT.
BRIDGE DECK	4,129 SQ.FT.
TOTAL	4,829 SQ.FT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	✳EPOXY COATED STEEL REINFORCING	STEEL REINFORCING
SPAN A	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	57.1		
POUR 2	78.8		
POUR 3●	40.2		
TOTAL✳✳	176.1	27,179	4,504

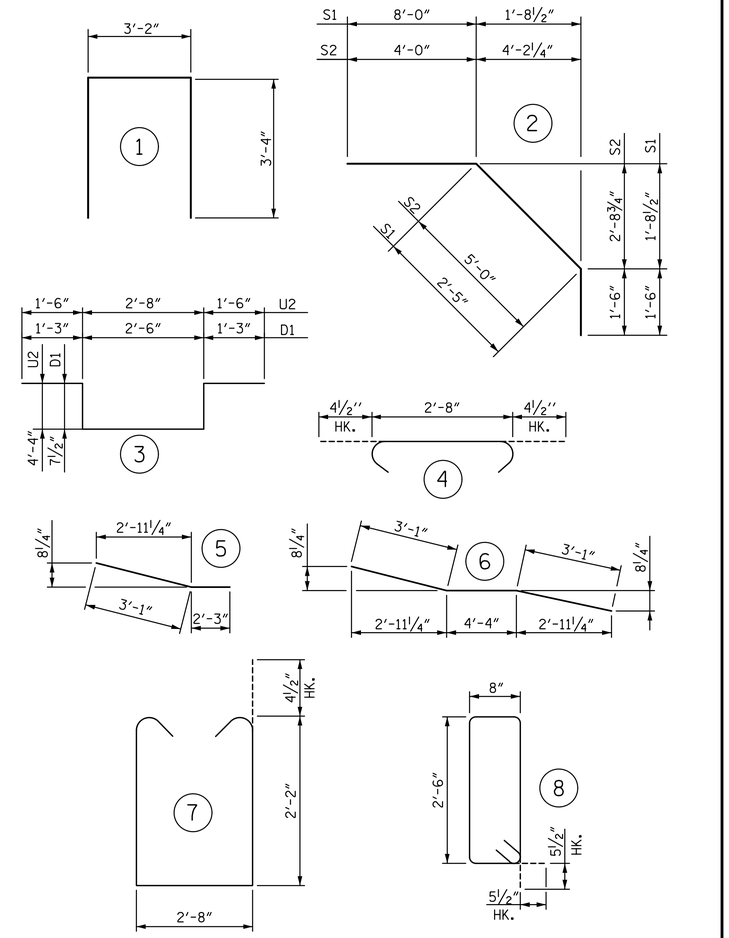
✳✳ QUANTITIES FOR CONCRETE BARRIER RAIL ARE NOT INCLUDED

● POUR 3 INCLUDES CONCRETE FOR SUPERSTRUCTURE PORTION OF INTEGRAL END BENT. ALL COSTS ASSOCIATED WITH THE SUPERSTRUCTURE PORTION OF THE INTEGRAL END BENT, INCLUDING BUT NOT LIMITED TO, MATERIALS, LABOR AND ALL INCIDENTALS SHALL BE INCLUDED IN THE CONTRACT BID PRICE FOR REINFORCED CONCRETE DECK SLAB. NO ADDITIONAL PAYMENT WILL BE MADE.

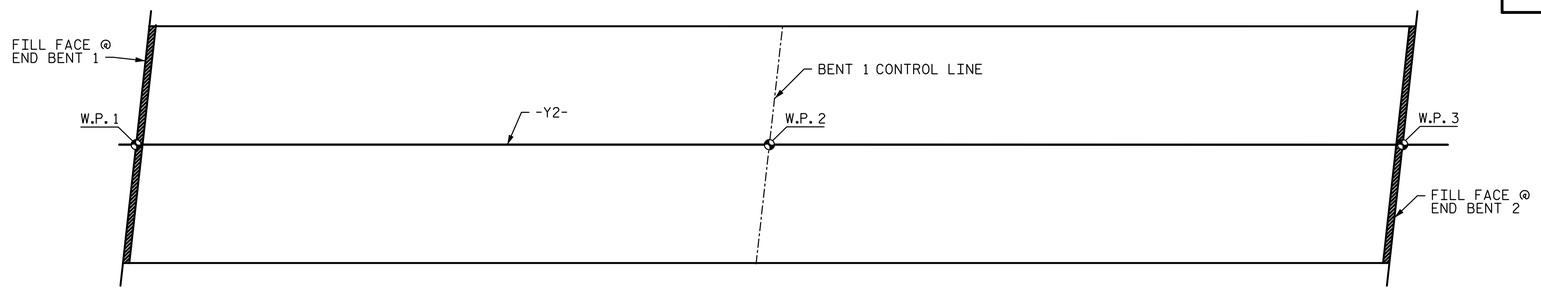
REINFORCING BAR SCHEDULE

MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	278	#5	STR.	30′-11″	8,964
A2	566	#5	STR.	4′-0″	2,361
				0″	
✳ A100	2	#5	STR.	5′-3″	11
✳ A101	2	#5	STR.	10′-6″	22
✳ A102	2	#5	STR.	15′-9″	33
✳ A103	2	#5	STR.	21′-0″	44
✳ A104	2	#5	STR.	26′-2″	55
✳ B1	84	#6	STR.	22′-0″	2,776
✳ B2	82	#6	STR.	17′-0″	2,094
✳ B3	42	#7	STR.	21′-10″	1,874
✳ B4	42	#7	STR.	43′-7″	3,742
✳ B5	41	#7	STR.	26′-0″	2,179
✳ B6	168	#4	STR.	18′-3″	2,048
B7	24	#5	STR.	42′-11″	1,074
✳ D1	416	#5	③	6′-3″	2,712
K1	16	#4	STR.	16′-6″	176
K2	6	#4	STR.	4′-2″	17
K3	6	#4	STR.	7′-7″	30
K4	6	#4	STR.	6′-10″	27
K5	6	#4	STR.	5′-0″	20
K6	4	#4	STR.	6″	1
K7	4	#4	STR.	2′-3″	6
K8	4	#4	STR.	1′-10″	5
K9	4	#4	STR.	11″	2
K10	8	#4	⑤	5′-4″	29
K11	8	#4	⑥	10′-6″	56
K12	6	#4	STR.	7′-6″	30
K13	6	#4	STR.	7′-7″	30
K14	6	#4	STR.	7′-4″	29
K15	6	#4	STR.	5′-0″	20
✳ S1	34	#4	②	11′-11″	271
✳ S2	30	#4	②	10′-6″	210
S3	69	#4	④	3′-5″	157
S4	12	#4	⑦	7′-9″	62
S5	18	#5	⑧	7′-3″	136
U1	34	#4	①	9′-10″	223
✳ U2	15	#4	③	14′-4″	144
V1	12	#4	STR	1′-8″	13
✳EPOXY COATED REINF. STEEL (LBS.)					27,179
REINFORCING STEEL (LBS.)					4,504

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 5,172)

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

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NORTH CAROLINA PROFESSIONAL SEAL 34955 ENGINEER TIMOTHY A. TOWNSEND

11/7/2018

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RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-20
1			3			TOTAL SHEETS
2			4			33

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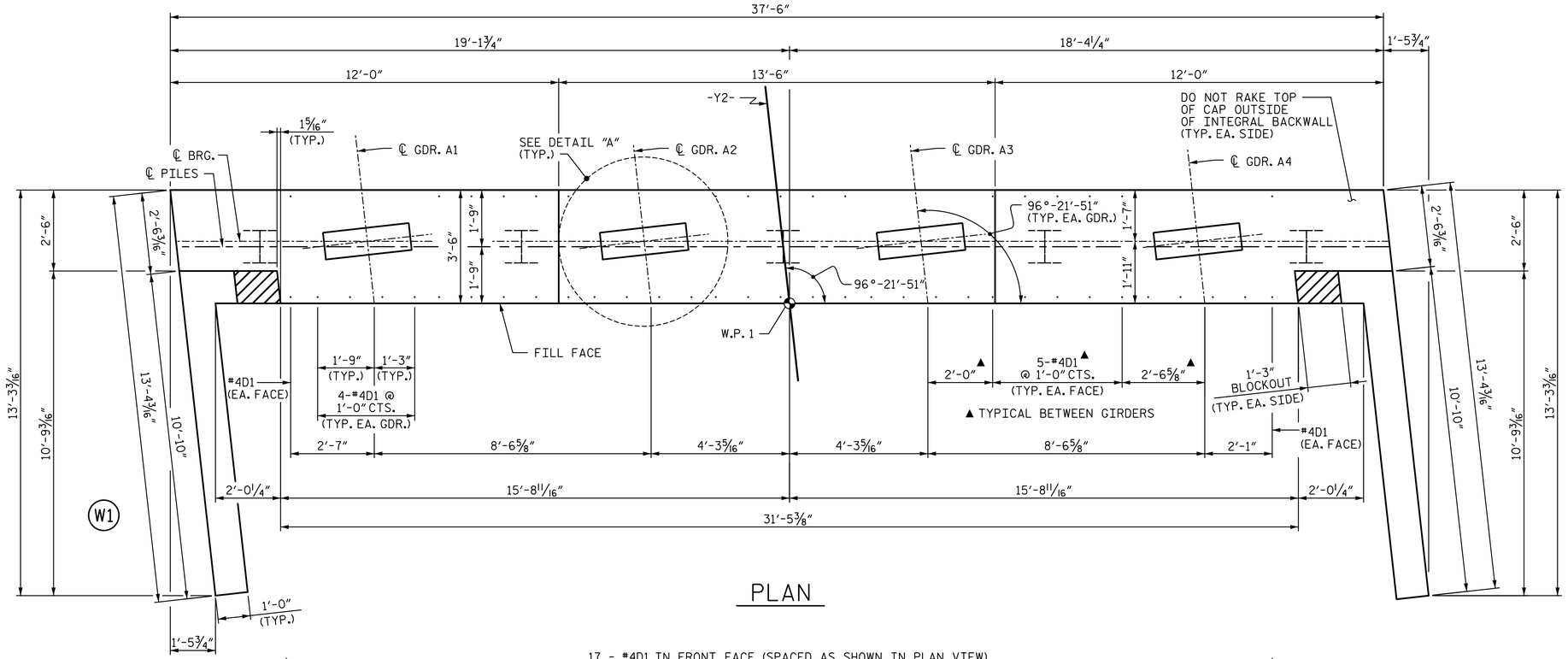
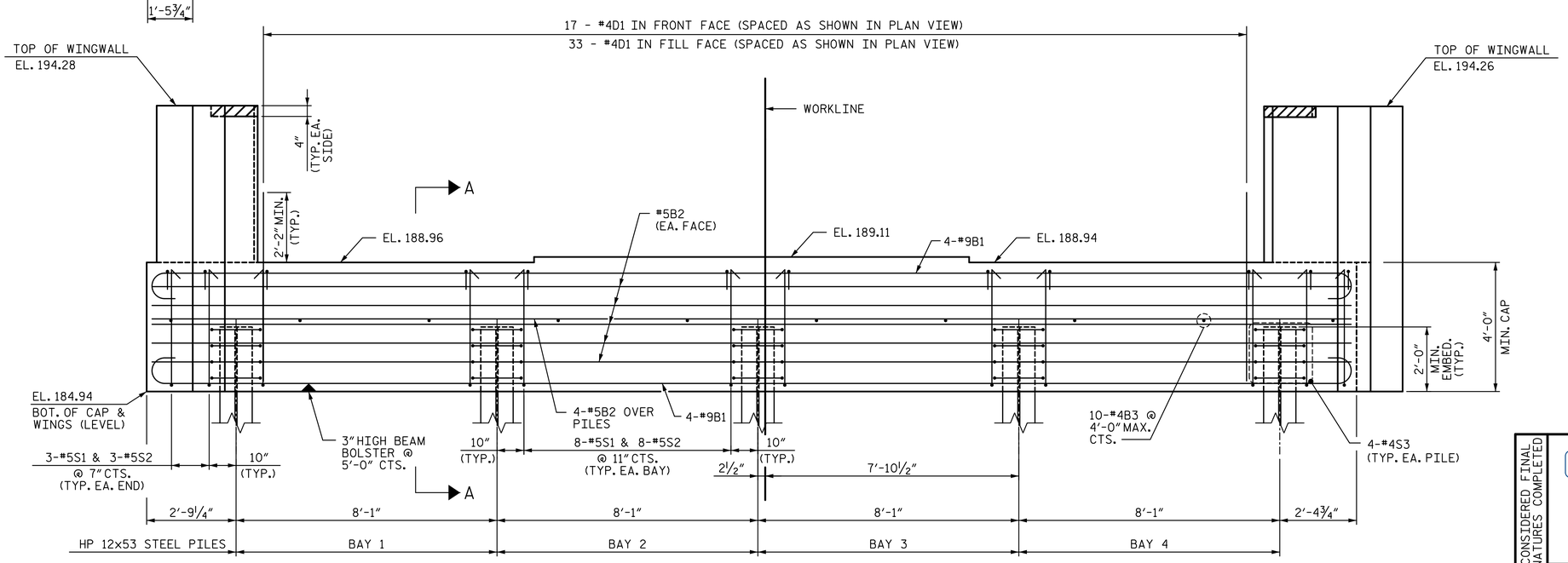


PLAN



ELEVATION

(LOOKING IN DIRECTION OF STATIONING)
(24″Ø CASING NOT SHOWN FOR CLARITY, SEE DETAIL ON SHEET 3 OF 3)

NOTES:

#4D1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR STIRRUPS.

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF THE PILE AT THE BOTTOM OF THE END BENT CAP.

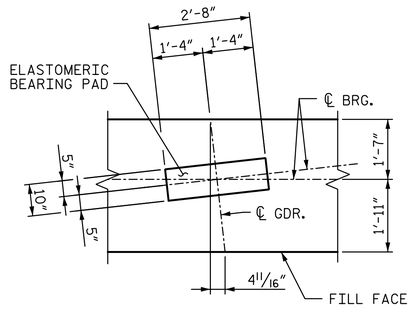
PILE SPLICE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND AWS D1.1.

FOR INTEGRAL BACKWALL REINFORCEMENT, SEE "TYPICAL SECTION AND INTEGRAL BACKWALL" SHEET.

FOR FOUNDATION NOTES, SEE "FOUNDATION LAYOUT" SHEET.

THE TOP SURFACE AREA OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA AND THE TOP OF CAP OUTSIDE THE INTEGRAL BACKWALL, SHALL BE RAKED TO A DEPTH OF ¼".

CONCRETE IN THE HATCHED AREA OF THE BACKWALL SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.



DETAIL "A"

(DIMENSIONS ARE TYPICAL FOR EACH GIRDER)

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 1 OF 4

DRAWN BY : VKS DATE : 7-18

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SUBSTRUCTURE

END BENT 1
PLAN & ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-21
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:14:10 AM
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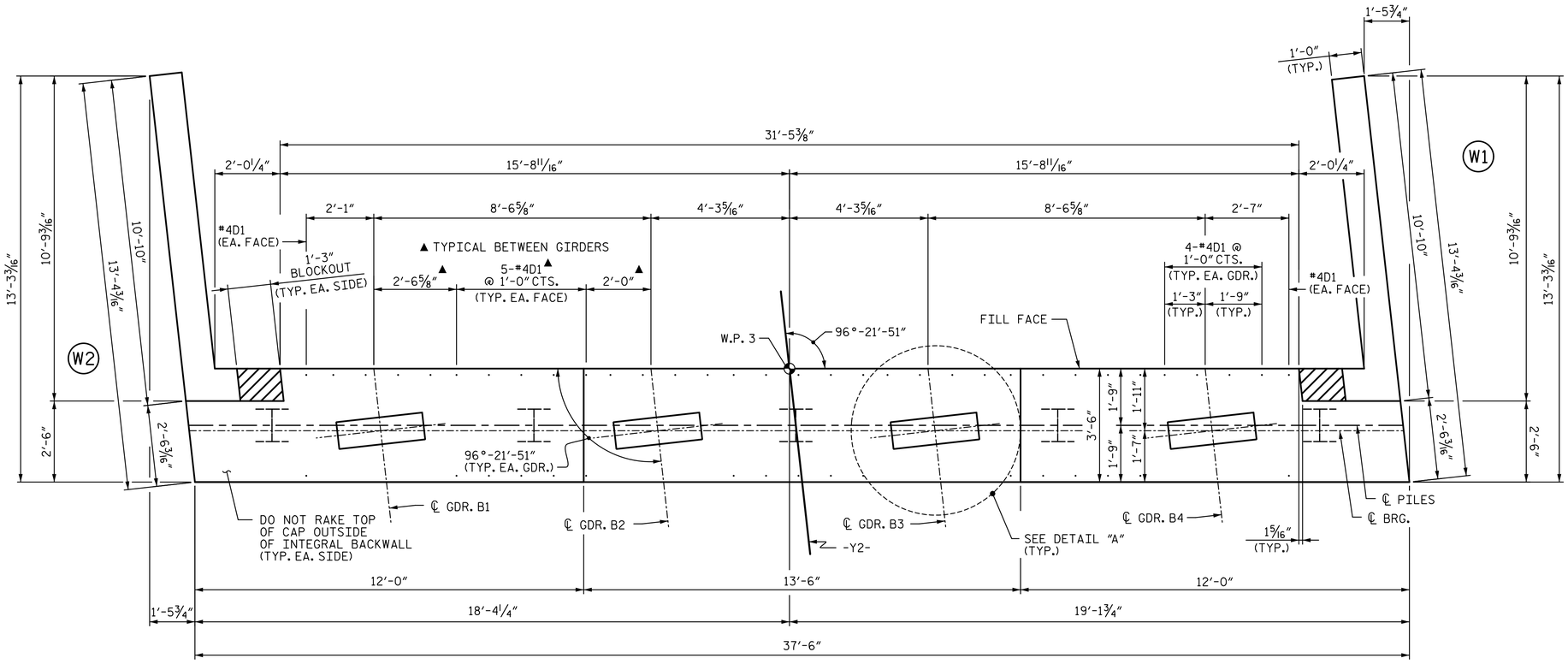
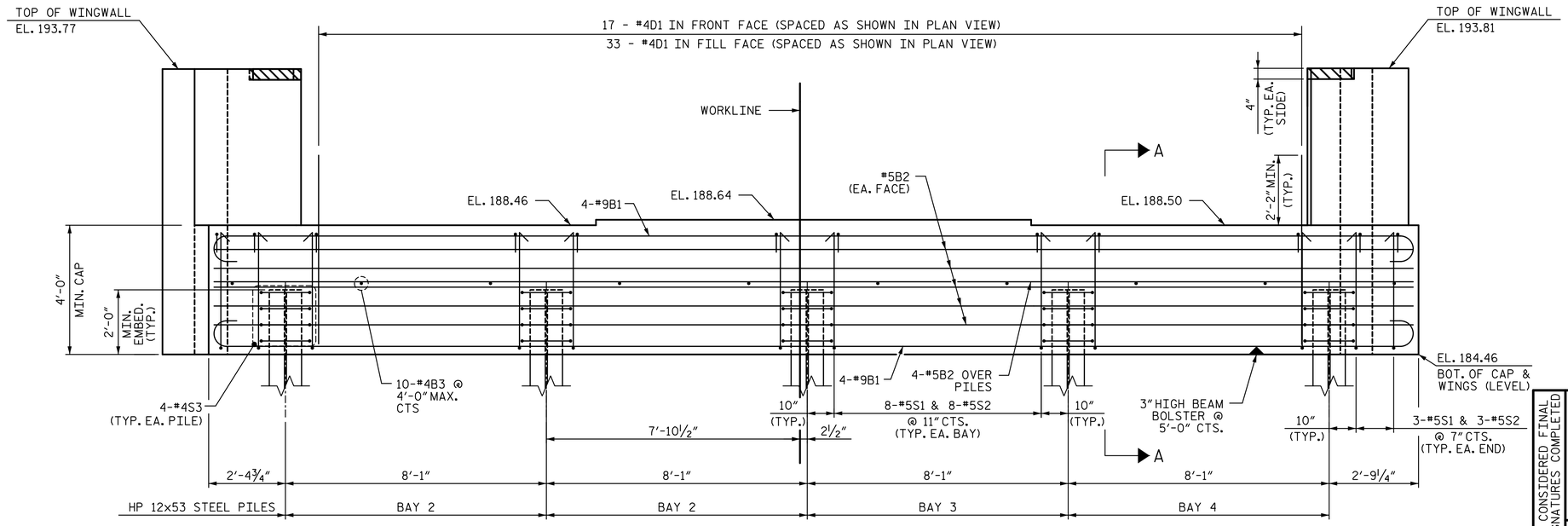
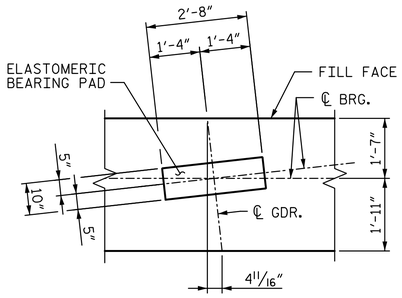


PLAN



ELEVATION

(LOOKING IN DIRECTION OF STATIONING)
(24" Ø CASING NOT SHOWN FOR CLARITY, SEE DETAIL ON SHEET 3 OF 3)



DETAIL "A"

(DIMENSIONS ARE TYPICAL FOR EACH GIRDER)

NOTES:

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PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 2 OF 4

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SUBSTRUCTURE

END BENT 2
PLAN & ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-22
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:14:12 AM
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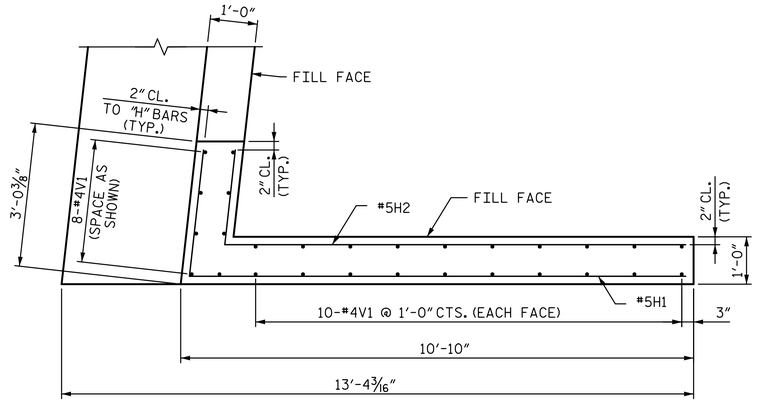
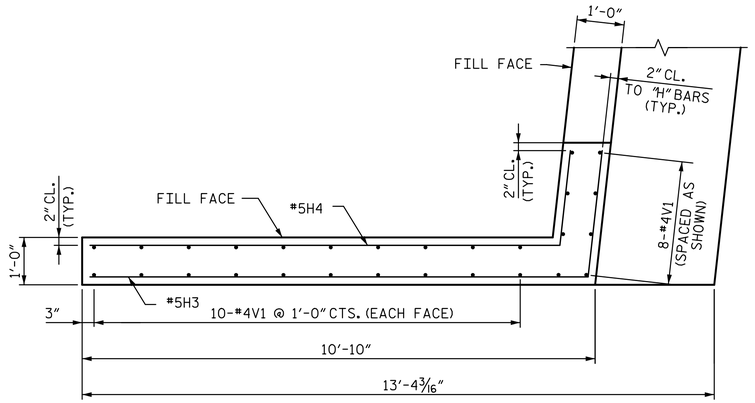
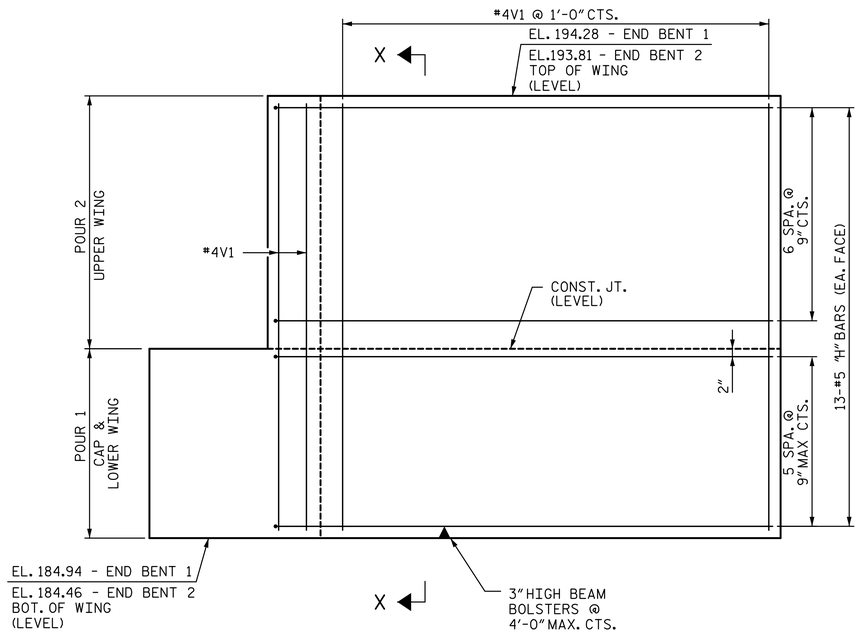


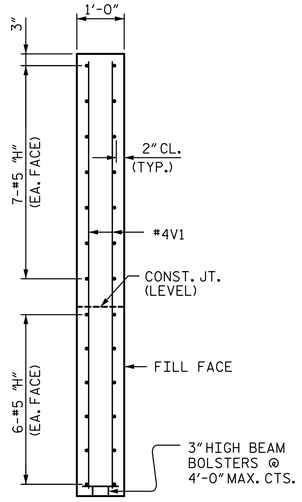
PLAN OF WING (W1)



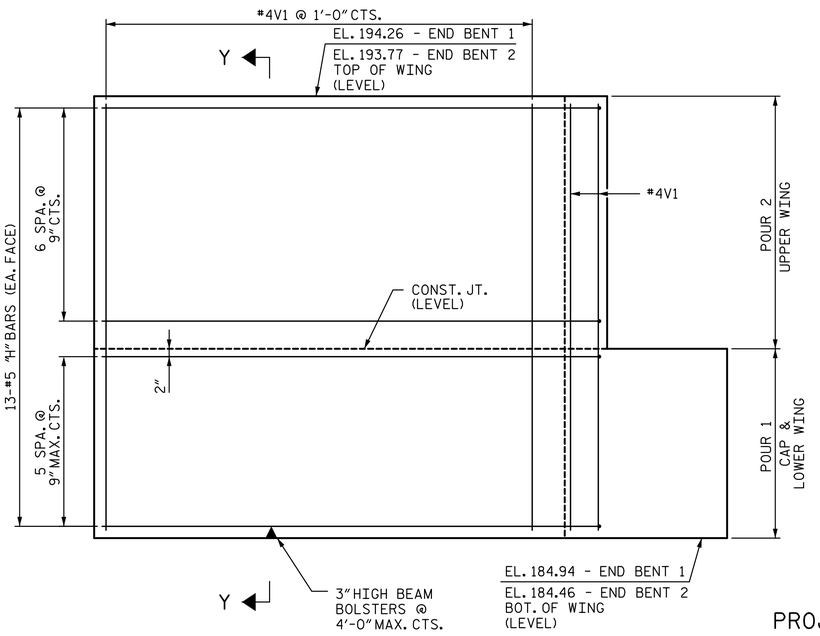
PLAN OF WING (W2)



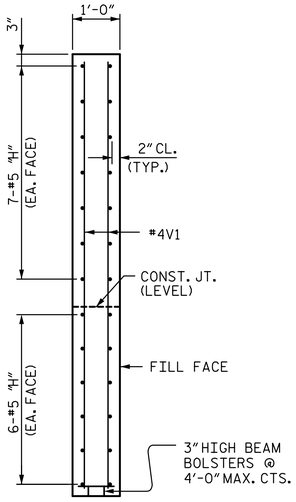
ELEVATION OF WING (W1)



SECTION X-X



ELEVATION OF WING (W2)



SECTION Y-Y

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 3 OF 4

DRAWN BY : VKS DATE : 7-18

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 & 2
WING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-23
1			3			TOTAL SHEETS
2			4			33

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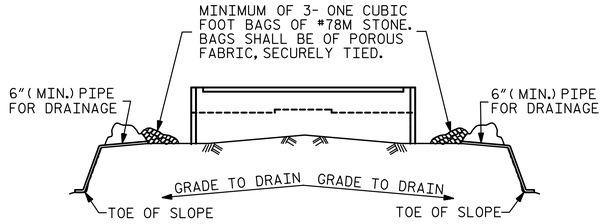
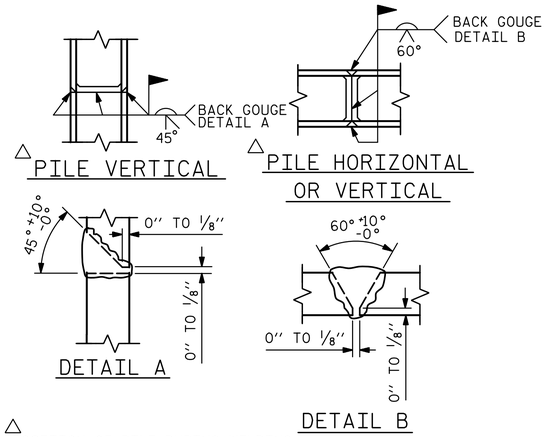


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

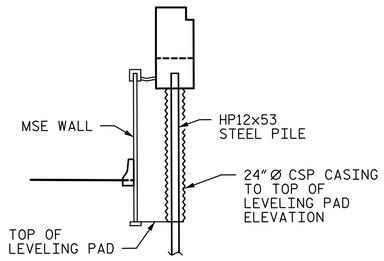
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

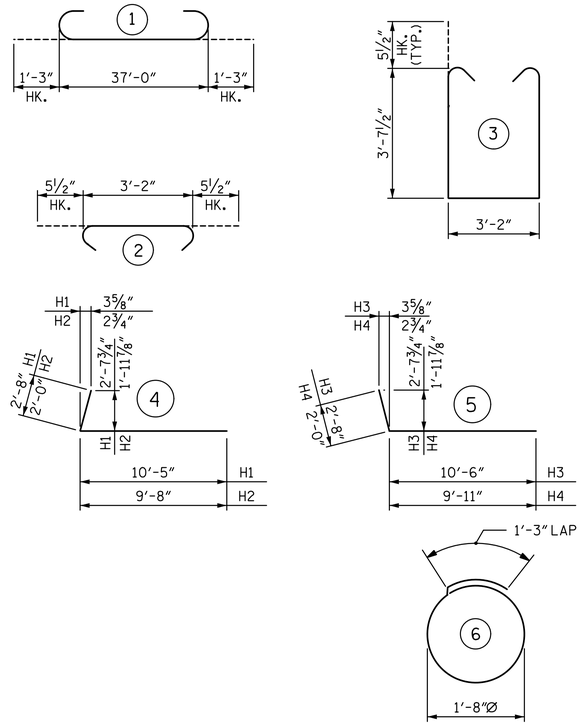
PILE SPLICE DETAILS

SECTION A-A



24" Ø CASING DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR ONE END BENT (2 REQ'D.)

BAR	NO	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	39'-6"	1,074
B2	14	#5	STR	37'-2"	543
B3	10	#4	STR	3'-2"	21
D1	50	#4	STR	6'-0"	200
H1	13	#5	4	13'-1"	177
H2	13	#5	4	11'-8"	158
H3	13	#5	5	13'-2"	179
H4	13	#5	5	11'-11"	162
S1	38	#5	3	11'-4"	449
S2	38	#5	2	4'-1"	162
S3	20	#4	6	6'-6"	87
V1	56	#4	STR	9'-0"	337
REINFORCING STEEL				LBS.	3,549

QUANTITIES

CLASS A CONCRETE (ONE END BENT):		
POUR 1:		
CAP , & LOWER WINGS	C.Y.	22.7
POUR 2:		
UPPER WINGS	C.Y.	5.1
TOTAL	C.Y.	27.8
END BENT 1		
HP 12x53 STEEL PILES	NO.	5
	LIN. FEET	400
PILE REDRIVES	EA.	5
PILE SETUP FOR HP 12x53 PILES	EA.	5
END BENT 2		
HP 12x53 STEEL PILES	NO.	5
	LIN. FEET	375
PILE REDRIVES	EA.	5
PILE SETUP FOR HP 12x53 PILES	EA.	5

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 4 OF 4

DRAWN BY : MBC DATE : 7-18

CHECKED BY : MLO DATE : 10-18

DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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DocuSigned by: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34955 TIMOTHY J. TOWNSEND 11/7/2018

STV 100 Years

STV ENGINEERS, INC. 900 West Trade St., Suite 715 Charlotte, NC 28202 NC License Number F-0991

Balfour Beatty Infrastructure Inc. BRANCH CIVIL — A Joint Venture

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 & 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-24
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:14:16 AM

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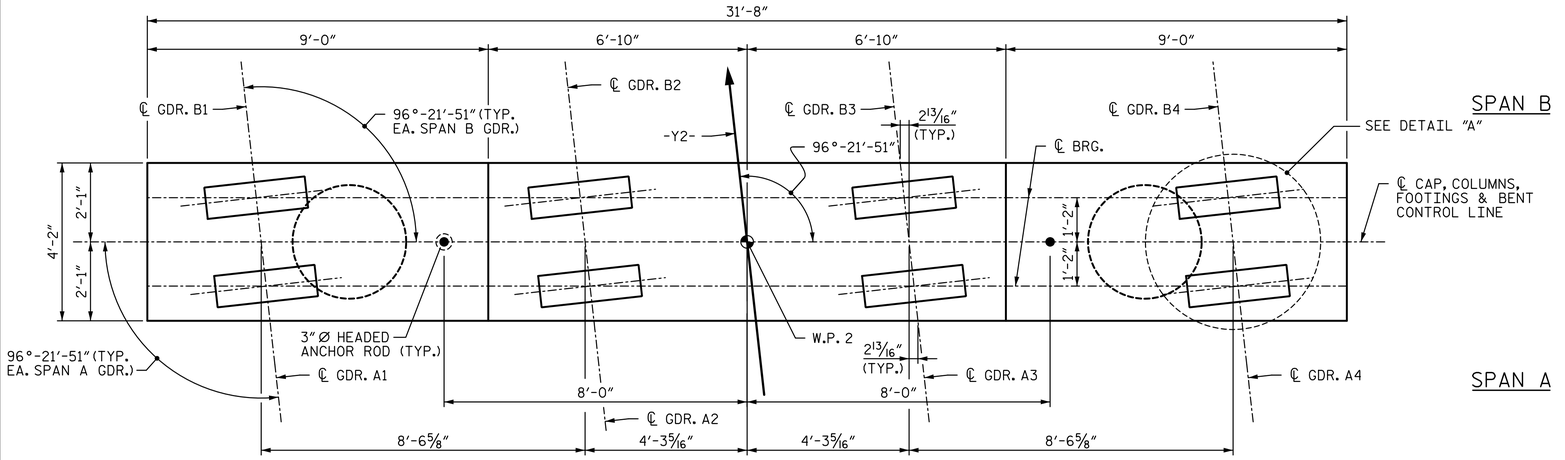


SPAN B

SPAN A

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR RODS.

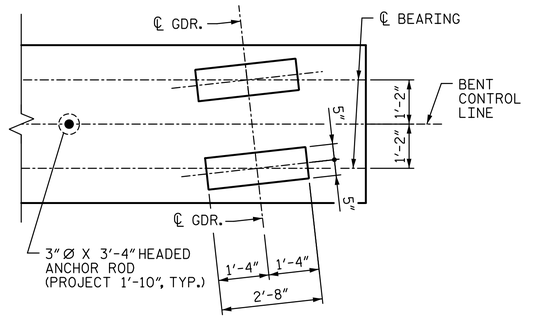
HOOKS ON BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

PILE SPLICE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND AWS D1.1.

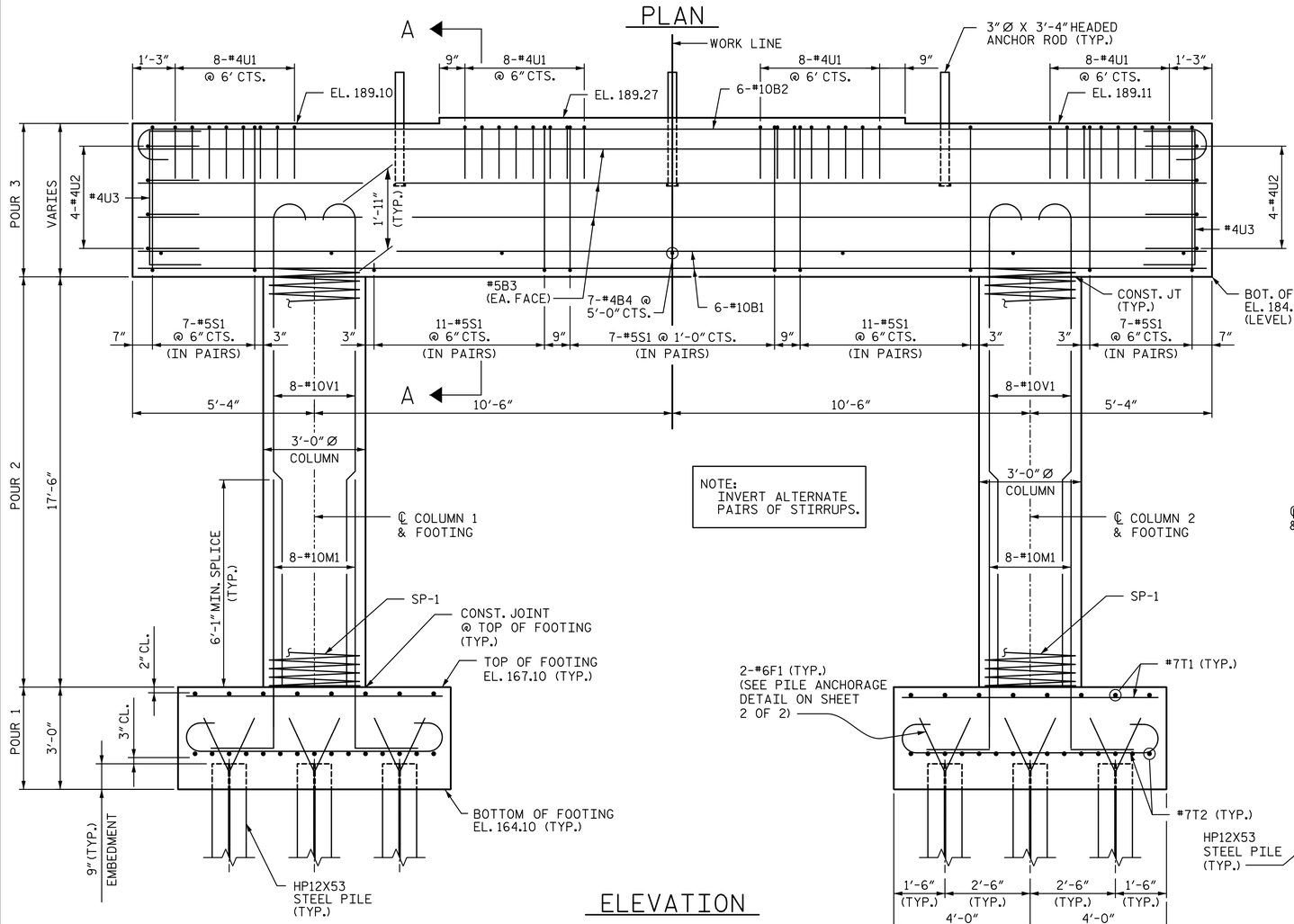
SEE SHEET 2 OF 2 FOR SECTION A-A.

SEE "FOUNDATION LAYOUT" SHEET FOR ADDITIONAL NOTES.

3" ANCHOR RODS SHALL BE ASTM F1554 GRADE 105 AND SHALL BE GALVANIZED PER THE STANDARD SPECIFICATIONS.

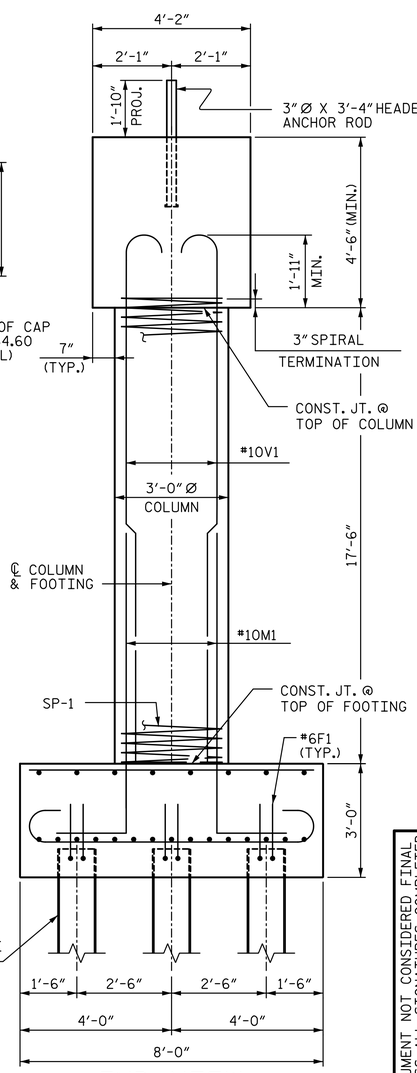


DETAIL "A"

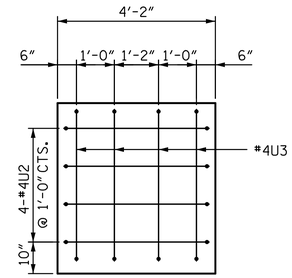


ELEVATION

NOTE:
INVERT ALTERNATE PAIRS OF STIRRUPS.



END VIEW



END VIEW
(LEFT END SHOWN, RIGHT END SIMILAR)

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 1 OF 2

DRAWN BY : VKS DATE : 7-18
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SUBSTRUCTURE

BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-25
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:14:18 AM
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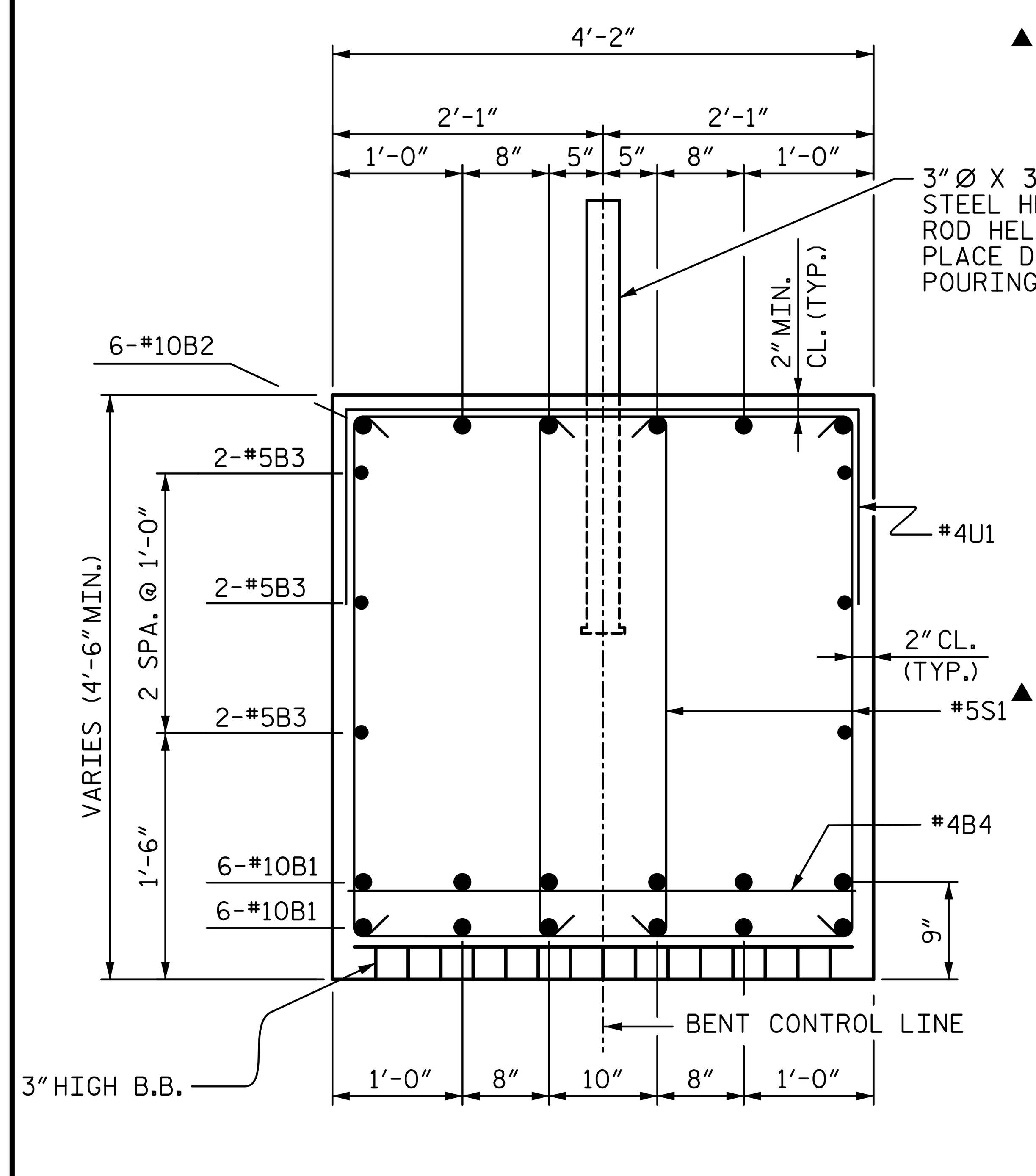
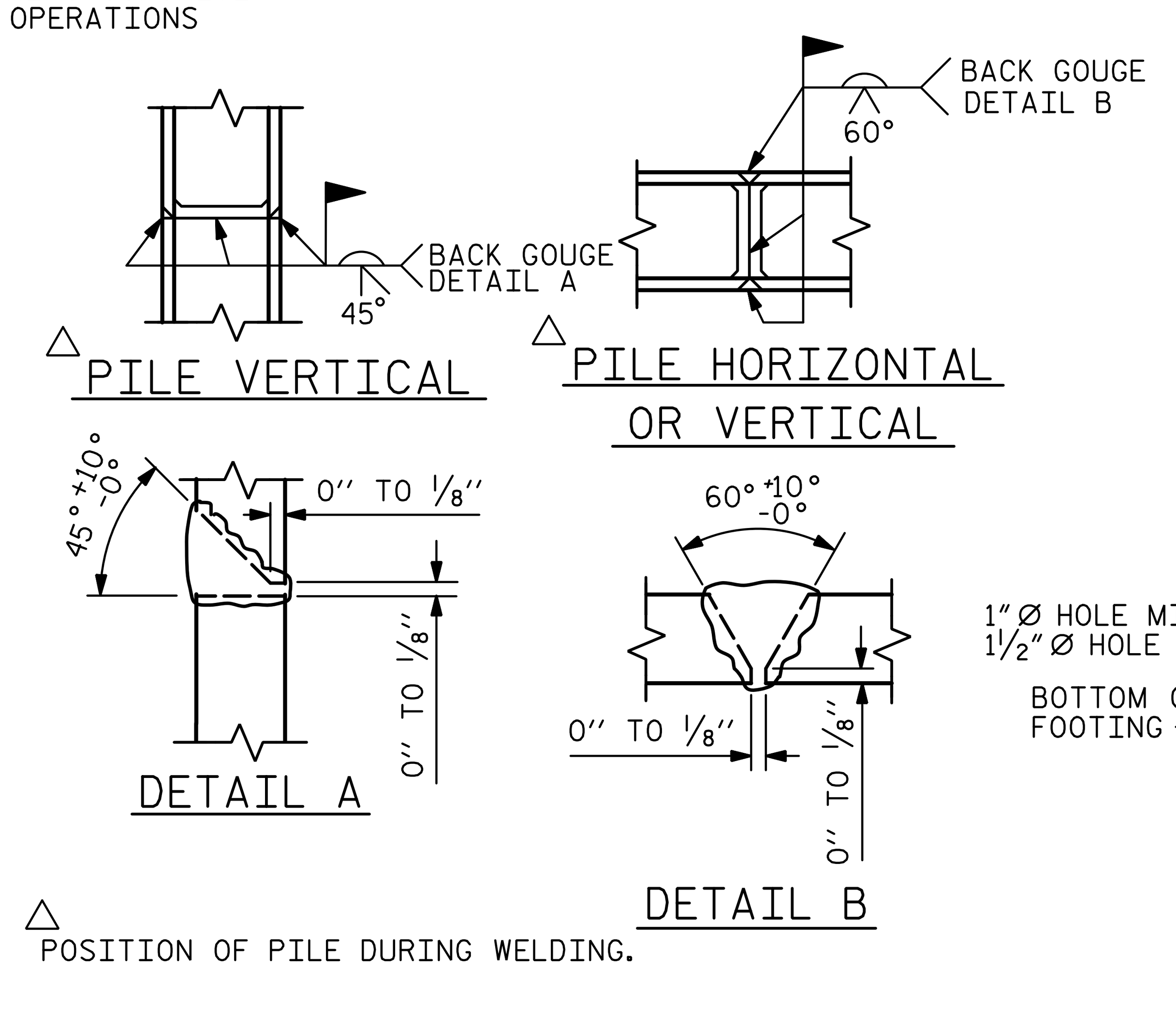


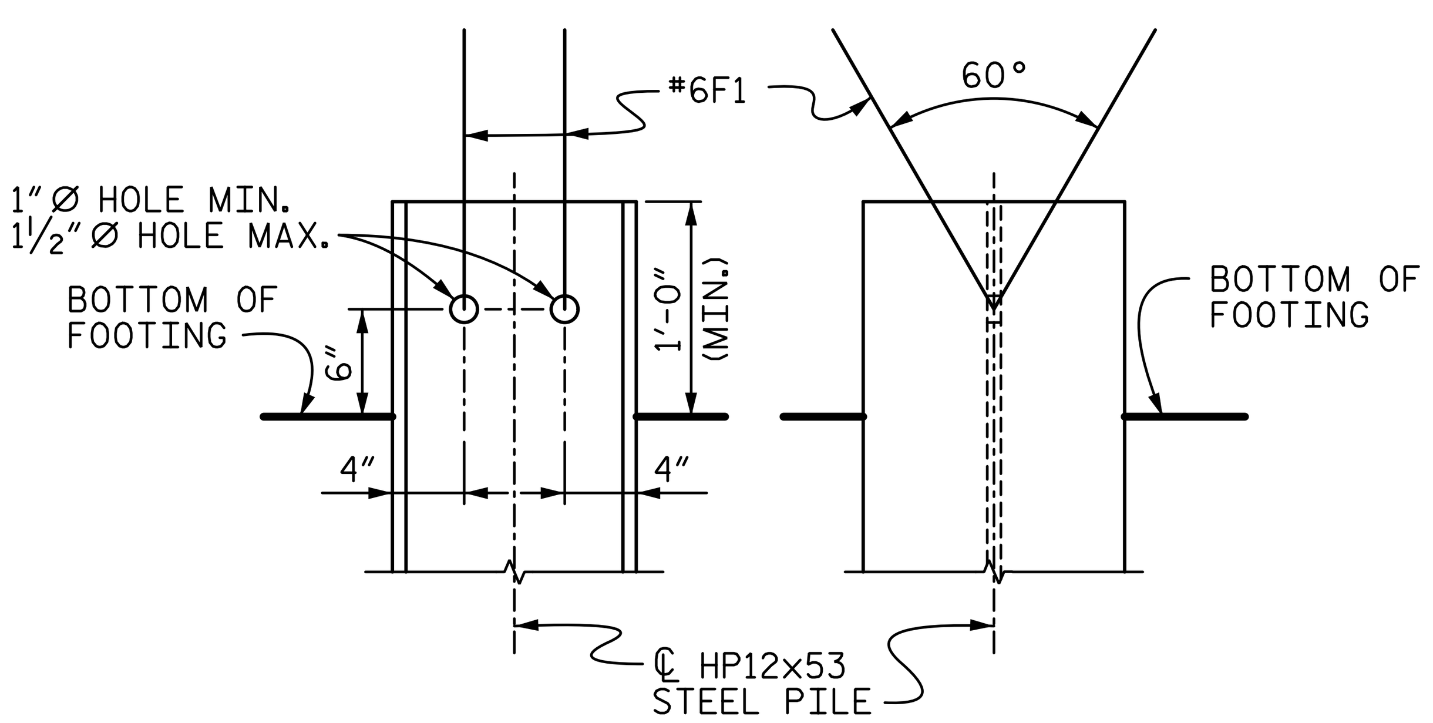
▲ INVERT ALTERNATE PAIRS OF STIRRUPS

SECTION A-A



△ POSITION OF PILE DURING WELDING.

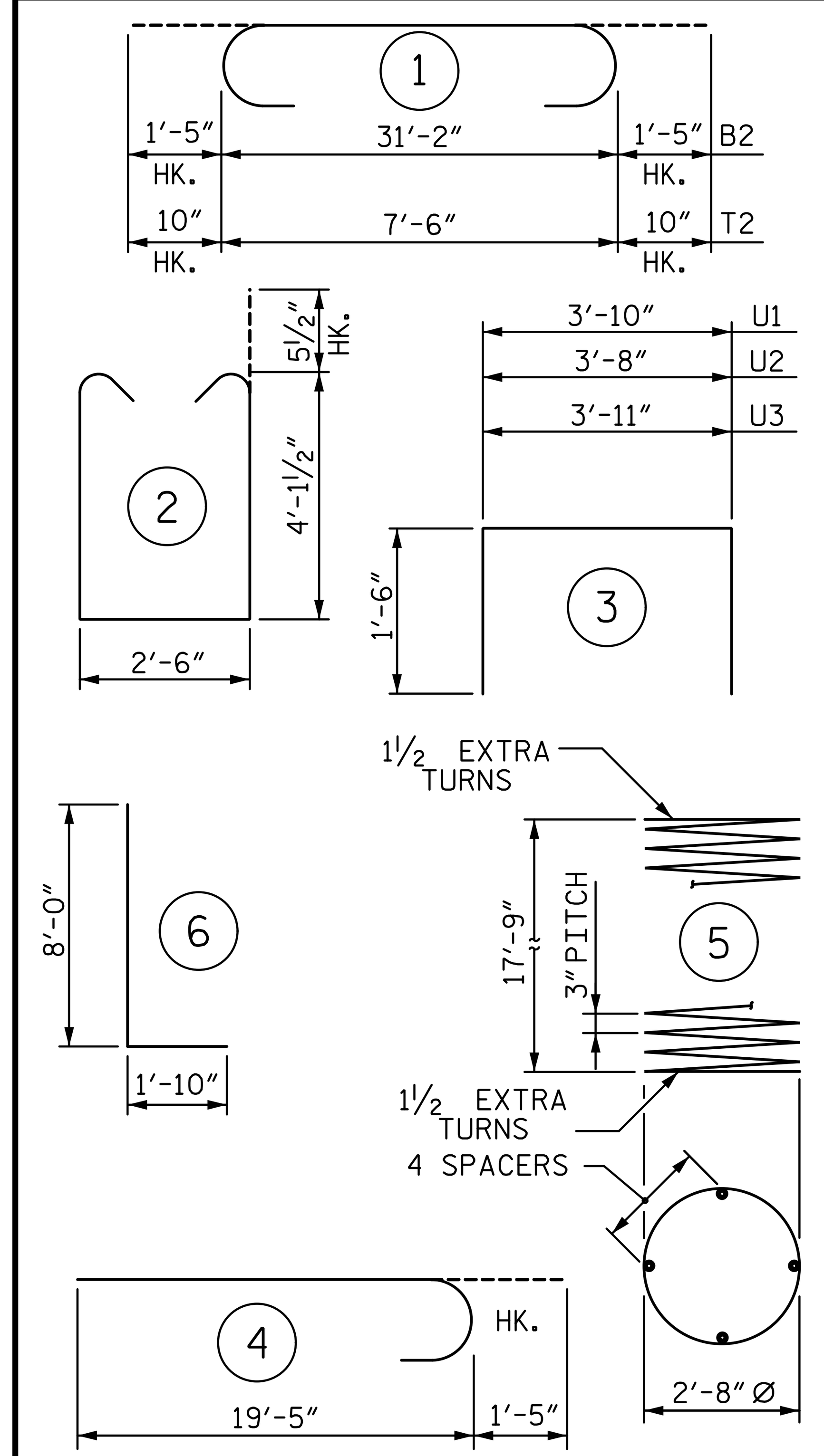
PILE SPLICE DETAILS



PILE ANCHORAGE DETAIL

HOLES SHALL BE DRILLED OR FLAME CUT.
GRIND AREA AROUND FLAME CUT HOLES TO REMOVE BURRS.
REINFORCING BARS SHALL BE TIED OR WEDGED TIGHTLY AGAINST THE TOP OF THE HOLE

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

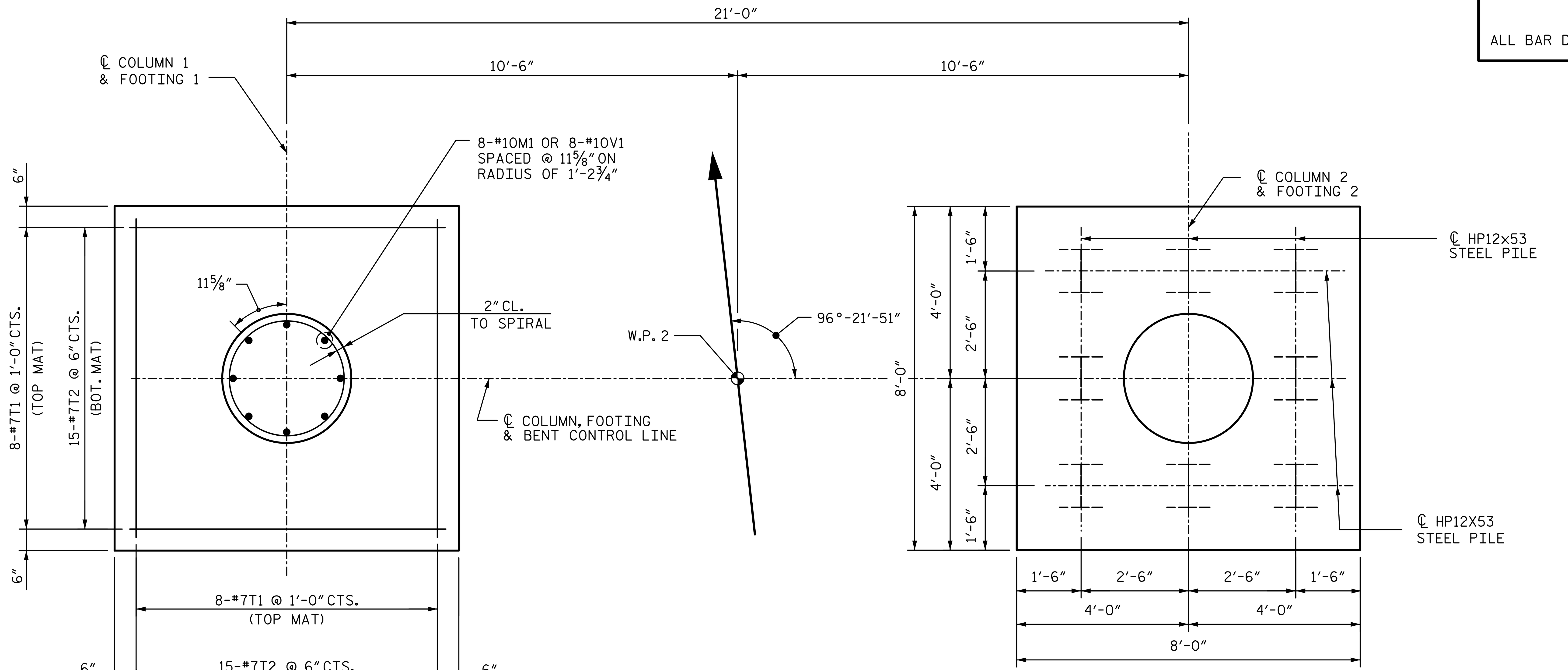
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#10	STR	31'-4"	1,618
B2	6	#10	1	34'-0"	878
B3	6	#5	STR	31'-4"	196
B4	7	#4	STR	3'-10"	18
M1	16	#10	6	9'-10"	677
S1	86	#5	2	11'-8"	1,046
T1	32	#7	STR	7'-8"	501
T2	60	#7	1	9'-2"	1,124
U1	32	#4	3	6'-10"	146
U2	8	#4	3	6'-8"	36
U3	8	#4	3	6'-11"	37
V1	16	#10	4	20'-10"	1,434
SP-1	2	✱✱	5	610'-7"	816

QUANTITIES

REINFORCING STEEL	LBS.	7,711
SPIRAL COLUMN REINFORCING STEEL	LBS.	816
CLASS A CONCRETE:		
POUR 1 - FOOTINGS	CU. YDS	14.2
POUR 2 - COLUMNS	CU. YDS	9.2
POUR 3 - CAP	CU. YDS	22.4
TOTAL	CU. YDS	45.8
HP 12x53 STEEL PILES	EA.	16
	FT.	880.0
PILE REDRIVES	EA.	8
PILE DRIVING EQUIP. SETP FOR HP 12x53 STEEL PILES	EA.	16
FOUNDATION EXCAVATION		LUMP SUM

✱✱ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



PLAN OF FOOTINGS

(ALL FOOTINGS, COLUMN DIMENSIONS AND REINFORCING STEEL ARE TYPICAL)
(PILE ARRANGMENT FOR FOOTINGS ARE THE SAME)

PROJECT NO. U2519AA-AB
CUMBERLAND/ROBESON COUNTY
STATION: 26+39.11 -Y2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

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REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S3-26
TOTAL SHEETS 33

DRAWN BY : VKS DATE : 7-18
CHECKED BY : MLO DATE : 10-18
DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

DATE: 11/5/2018 TIME: 10:14:20 AM
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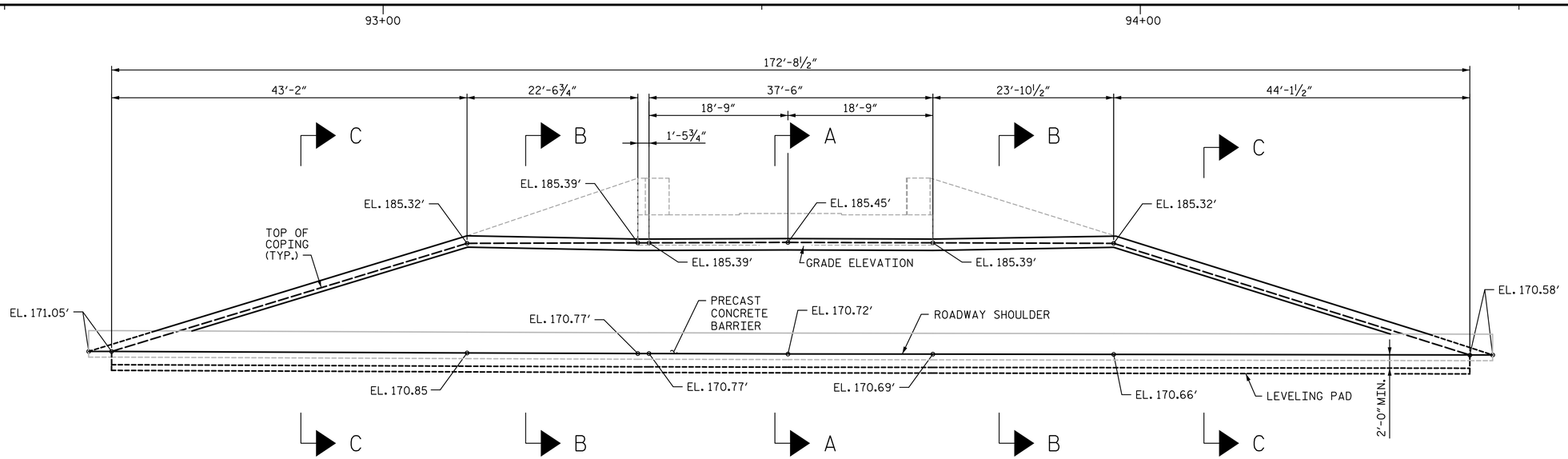
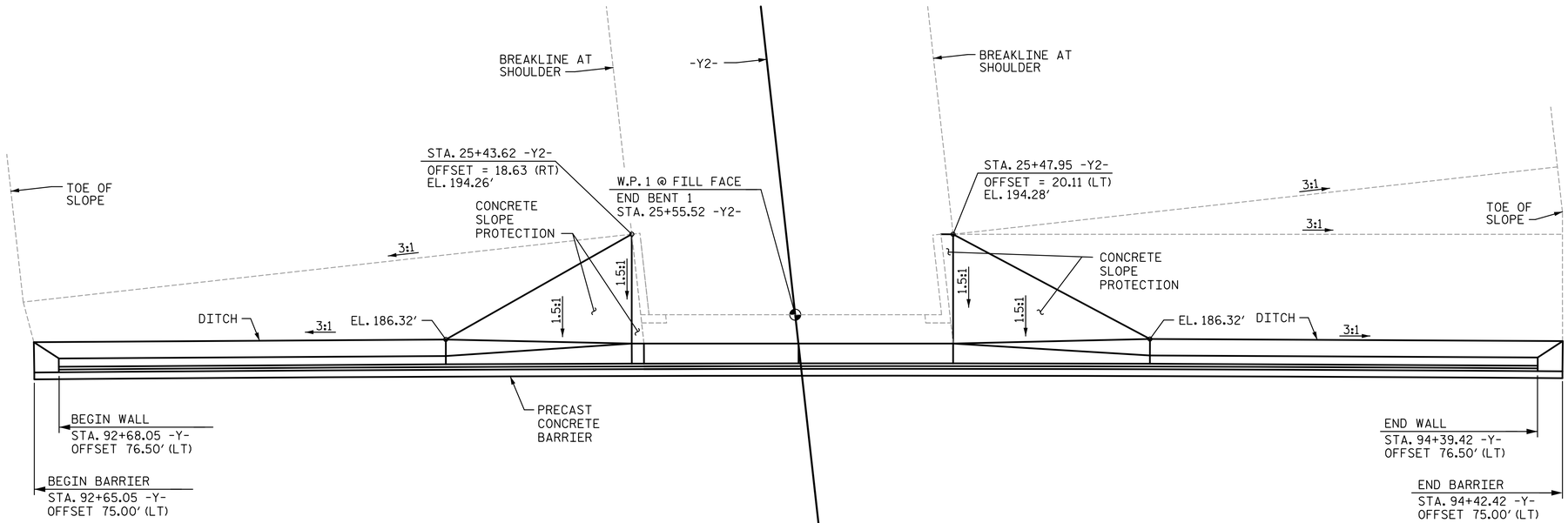


ELEVATION



PLAN

(COPING NOT SHOWN FOR CLARITY)

NOTES:

1. FOR SECTIONS AND DETAILS SEE MSE WALL AND CONCRETE SLOPE PROTECTION SHEET 3 OF 4.
2. FOR NOTES AND QUANTITIES SEE MSE WALL AND CONCRETE SLOPE PROTECTION SHEET 4 OF 4.

DRAWN BY : VKS DATE : 9-18
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DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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NORTH CAROLINA PROFESSIONAL SEAL 34955 ENGINEER TIMOTHY J. TOWNSEND
11/7/2018

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MSE WALL AND CONCRETE SLOPE PROTECTION AT END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-27
1			3			TOTAL SHEETS
2			4			33

PROJECT NO. U2519AA-AB
CUMBERLAND/ROBESON COUNTY
STATION: 26+39.11 -Y2-

SHEET 1 OF 4

DATE: 11/5/2018 TIME: 10:14:22 AM
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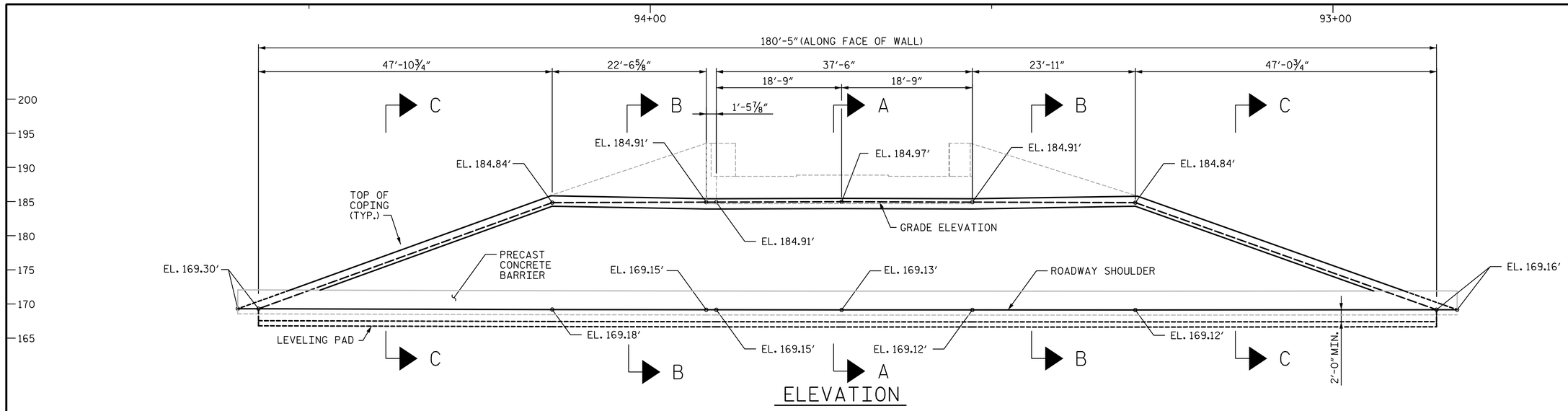
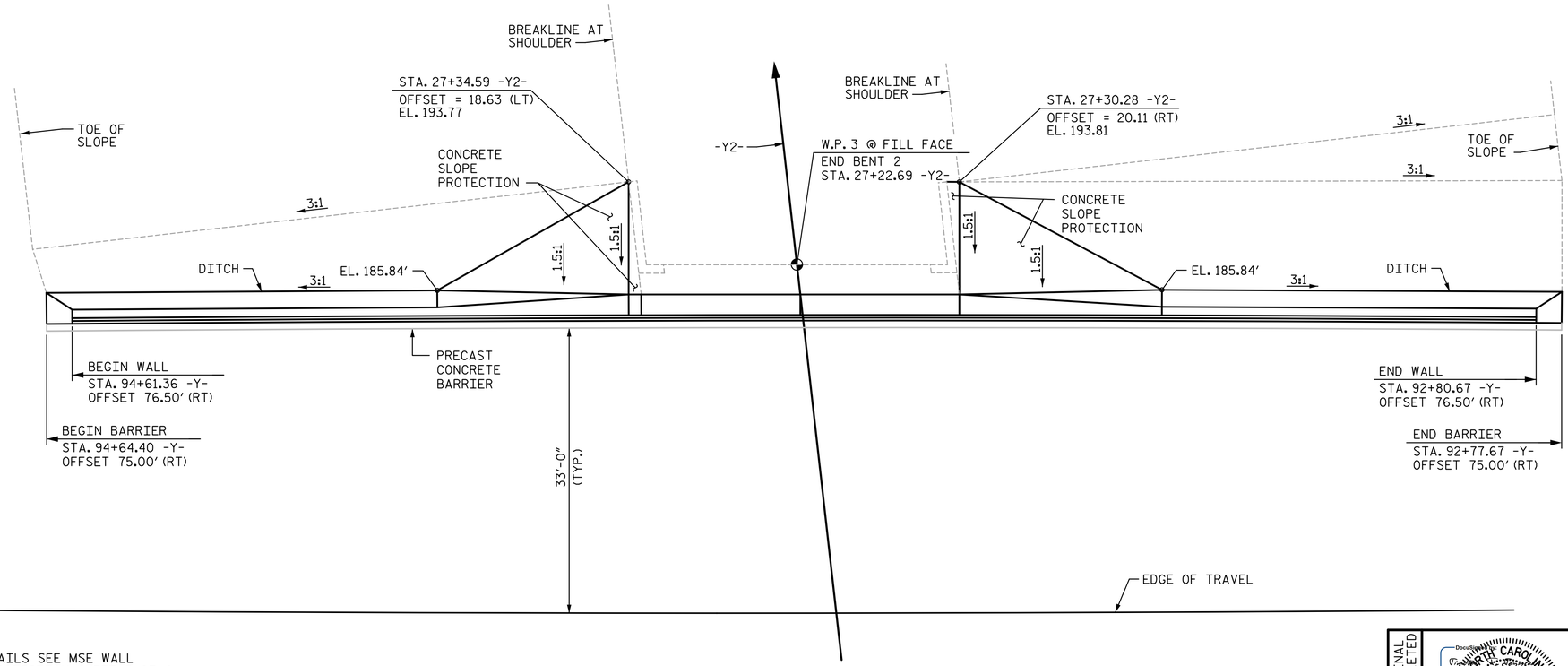


ELEVATION



PLAN

(COPING NOT SHOWN FOR CLARITY)

NOTES:

1. FOR SECTIONS AND DETAILS SEE MSE WALL AND CONCRETE SLOPE PROTECTION SHEET 3 OF 4.
2. FOR NOTES AND QUANTITIES SEE MSE WALL AND CONCRETE SLOPE PROTECTION SHEET 4 OF 4.

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 2 OF 4

DRAWN BY : VKS DATE : 9-18

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DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

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DocuSigned by: Timothy L. Townsend 11/7/2018

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11/7/2018

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RALEIGH

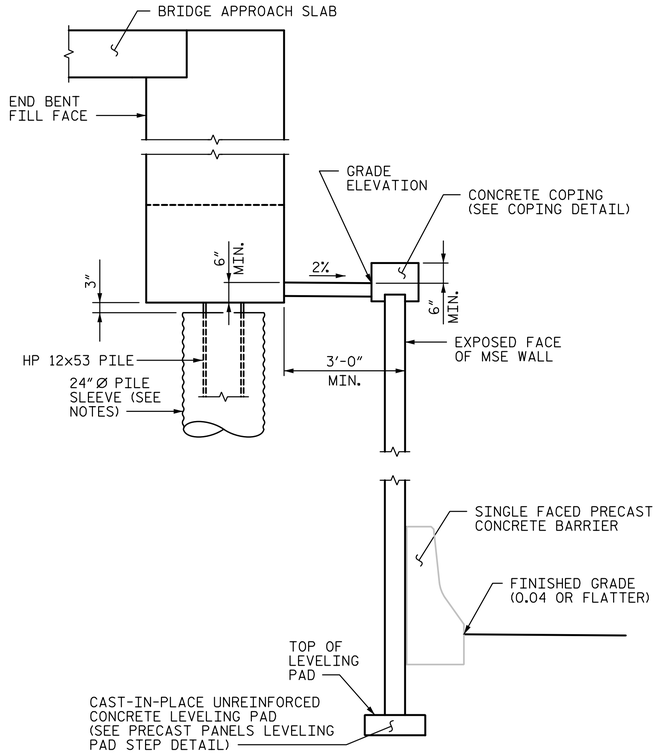
MSE WALL AND CONCRETE SLOPE PROTECTION AT END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-28
1			3			TOTAL SHEETS
2			4			33

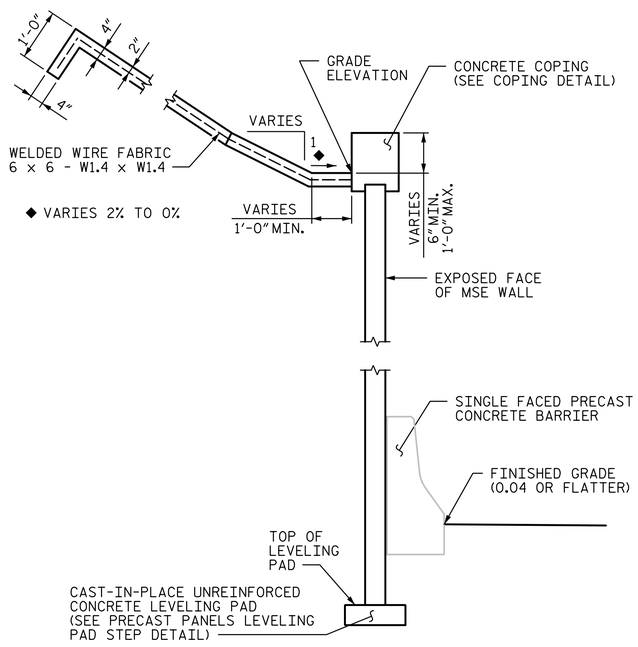
DATE: 11/5/2018 TIME: 10:14:25 AM
FILE: r:\Structures\Str 3 Y2 over Y\Ustation\RFC\403_055_U2519_SMU_SP_028_770515.dgn

NOTES:

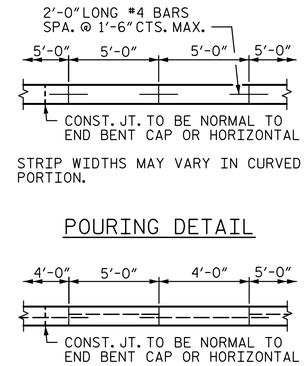
1. FOR MSE WALL AND CONCRETE SLOPE PROTECTION PLAN AND ELEVATION, SEE SHEETS 1 OF 4 AND 2 OF 4.
2. EXTEND BOTTOM OF PIPE SLEEVE TO TOP OF LEVELING PAD ELEVATION.
3. PIPE SLEEVE SHALL BE 16 GAUGE GALVANIZED CORRUGATED STEEL PIPE FILLED WITH SAND.
4. FOR ADDITIONAL NOTES, SEE SHEET 4 OF 4.



SECTION A-A



SECTION B-B



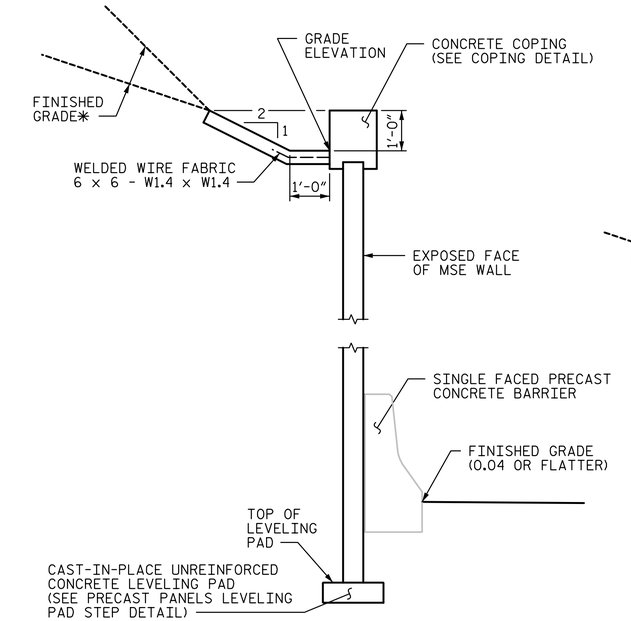
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL

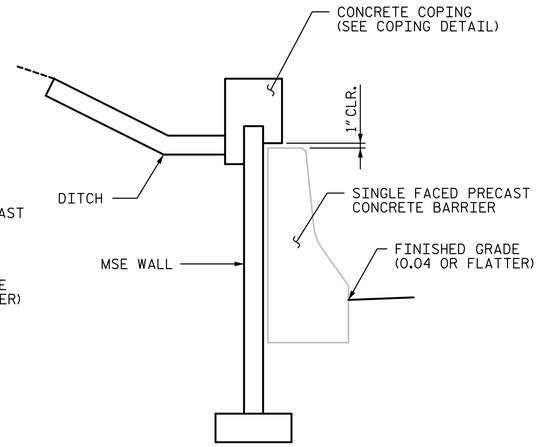
POUR A 4'-0'' STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

SLOPE PROTECTION DETAIL



SECTION C-C



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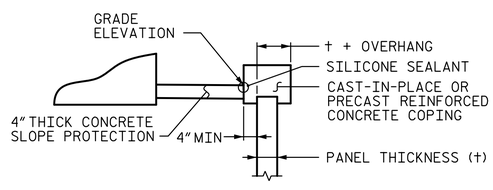
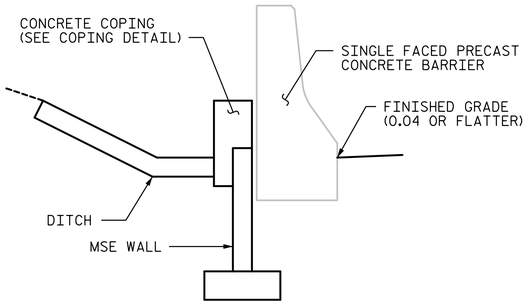
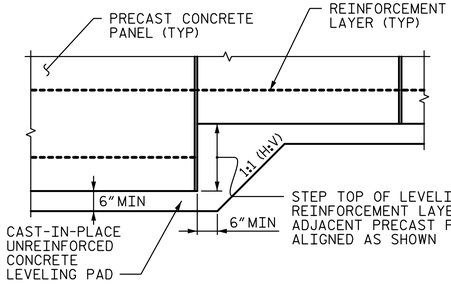


COPING DETAIL



SECTION AT END OF WALL



PRECAST PANELS LEVELING PAD STEP DETAIL

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 3 OF 4

DRAWN BY : VKS DATE : 9-18

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RALEIGH

MSE WALL AND CONCRETE SLOPE PROTECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-29
1			3			TOTAL SHEETS
2			4			33

DATE: 11/5/2018 TIME: 10:14:27 AM
FILE: r:\Structures\Str 3 Y2 over Y\Ustation\RFC\403_057_U2519_SMU_SP_029_770515.dgn

MSE WALL NOTES:

1. FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

2. USE AN MSE WALL SYSTEM WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALLS AT END BENT NO. 1 AND END BENT NO. 2.

3. PILE SLEEVES ARE REQUIRED AROUND PILES FOR END BENT NO. 1 AND END BENT NO. 2.

4. BEFORE BEGINNING MSE WALL DESIGN, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

5. DESIGN RETAINING WALLS AT END BENT NO. 1 AND END BENT NO. 2 FOR THE FOLLOWING:

   1) H = DESIGN HEIGHT + EMBEDMENT
   2) DESIGN LIFE = 100 YEARS
   3) MAXIMUM FACTORED VERTICAL STRESS ON FOUNDATION MATERIAL = 4,800 PSF FOR END BENT NO. 1 AND END BENT NO. 2.
   4) MINIMUM REINFORCEMENT LENGTH (L) = 1.0 * H FOR END BENT NO. 1 AND END BENT NO. 2. THIS IS CONTROLLED BY THE GLOBAL STABILITY ANALYSIS.
   5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE *	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	115	34	0
* SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

   6) IN -SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	125	30	0
FOUNDATION	120	22	900

6. DESIGN RETAINING WALLS FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

7. DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

8. MSE WALL CONSTRUCTION SEQUENCE WILL REQUIRE COORDINATION WITH PILE INSTALLATION FOR BRIDGE FOUNDATIONS. AFTER EXCAVATING WALL AREA TO BOTTOM OF WALL SUBGRADE ELEVATION, PILES SHALL BE DRIVEN TO SATISFACTORY BEARING.

9. OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE MSE ABUTMENT WALL TO WITHIN 1 FT OF THE BOTTOM OF CAP ELEVATION.

10. FOUNDATIONS FOR END BENT WILL INTERFERE WITH REINFORCEMENT FOR WALL. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS. SUBMIT PROPOSED PILE OBSTRUCTION DETAIL FOR APPROVAL.

11. JOINTS IN THE COPING SHALL BE CONSTRUCTED IN ACCORDANCE WITH ARTICLE 825-10 OF THE STANDARD SPECIFICATIONS. JOINTS SHALL BE LOCATED IN ALL FACES OF THE COPING AT 10 FEET MINIMUM CENTERS TO COINCIDE WITH PANEL JOINTS. EVERY THIRD JOINT SHALL BE AN EXPANSION JOINT. ALL OTHER JOINTS SHALL BE GROOVED CONTRACTION JOINTS 1/2" IN DEPTH. REINFORCING STEEL SHALL BE 2 INCHES CLEAR OF EXPANSION JOINTS.

12. COPING WIDTH SHALL PROJECT FROM WALL FACE NO MORE THAN 4".

13. A SEPERATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALLS AT END BENT NO. 1 AND END BENT NO. 2.

14. A DRAIN IS REQUIRED FOR RETAINING WALLS AT END BENT NO. 1 & END BENT NO. 2.

SLOPE PROTECTION NOTES:

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS.

ALTERNATE "A" SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE DETAILS ON SHEETS 1 OF 4 AND 2 OF 4 WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6".

BRIDGE @ STA. 26+39.11 -Y2-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	81.6	164
END BENT 2	70.1	141

* QUANTITY SHOWN IS BASED ON 5' POURS.

ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
MSE RETAINING WALL AT EB 1	2,035 SF
MSE RETAINING WALL AT EB 2	2,160 SF

PROJECT NO. U2519AA-AB

CUMBERLAND/ROBESON COUNTY

STATION: 26+39.11 -Y2-

SHEET 4 OF 4

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 34955 TIMOTHY J. TOWNSEND 11/7/2018

STV 100 years

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MSE WALL AND CONCRETE SLOPE PROTECTION NOTES AND QUANTITIES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-30
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : VKS DATE : 9-18
CHECKED BY : TJT DATE : 10-18

DESIGN ENGINEER OF RECORD: T. TOWNSEND DATE : 10-18

DATE: 11/5/2018 TIME: 10:14:30 AM
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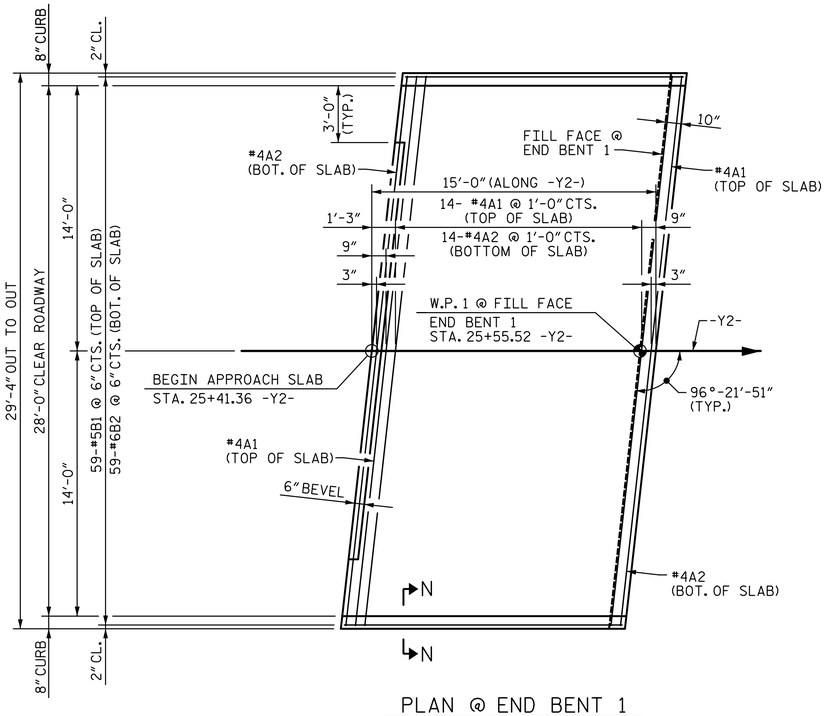
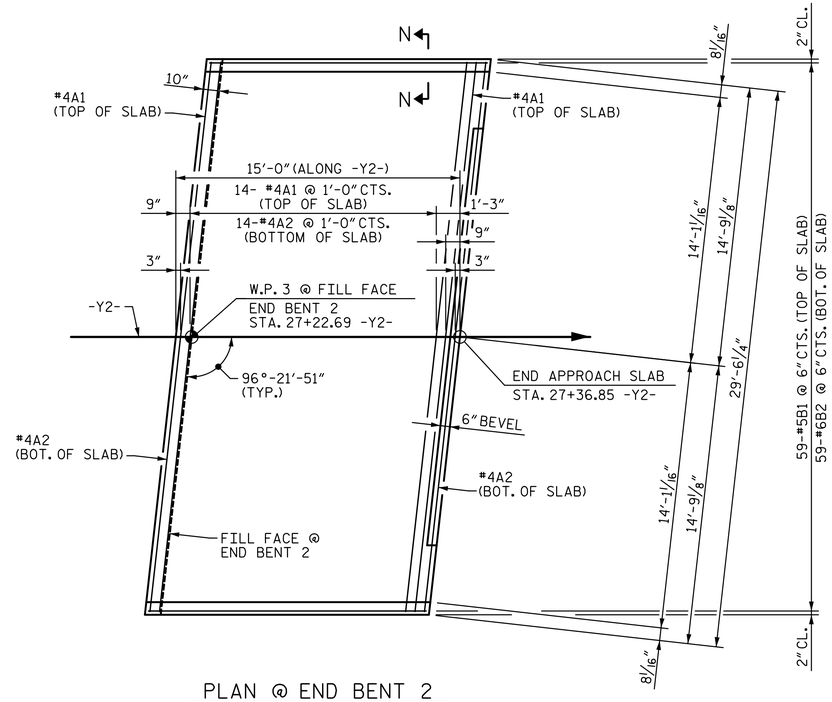


PLAN @ END BENT 1



PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS.

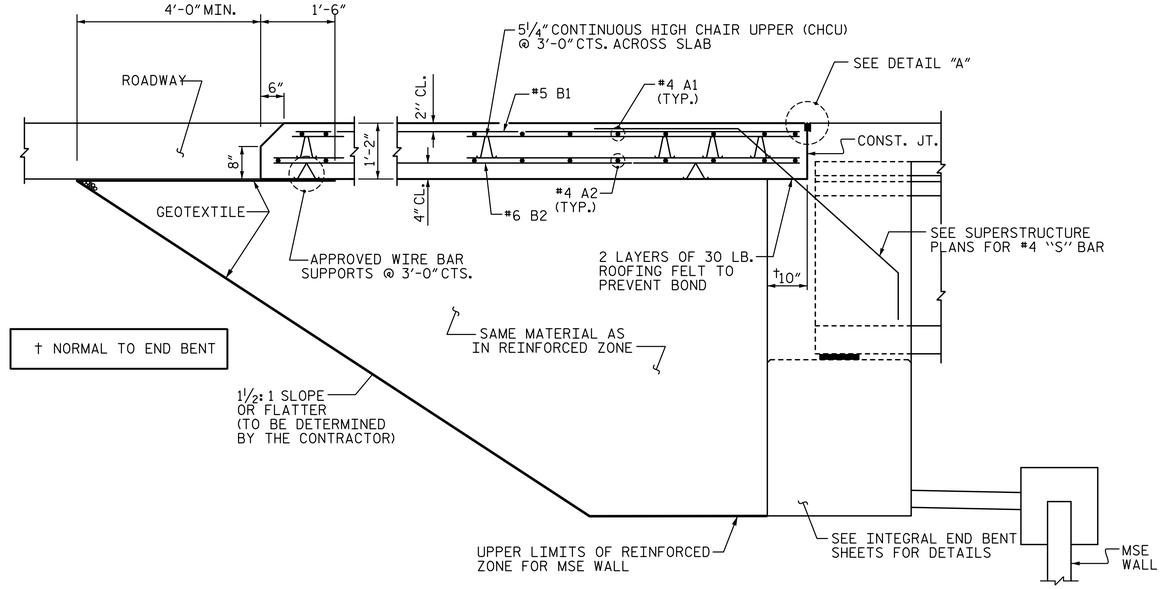
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	16	#4	STR	29′-2″	312
A2	16	#4	STR	29′-2″	312
✳ B1	59	#5	STR	14′-1″	867
B2	59	#6	STR	14′-8″	1,300
REINFORCING STEEL				LBS.	1,612
✳ EPOXY COATED REINFORCING STEEL				LBS.	1,179
CLASS AA CONCRETE				C. Y.	19.0

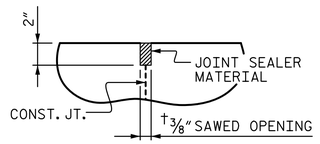
SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	2′-0″	1′-9″
#5	2′-6″	2′-2″
#6	3′-10″	2′-7″

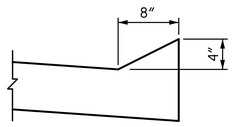


SECTION THRU SLAB

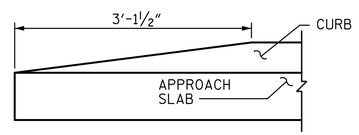
(TYPE I - STANDARD APPROACH FILL)



DETAIL "A"



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE AND BACKFILL MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

BACKFILL MATERIAL SHALL BE THE SAME MATERIAL USED IN THE REINFORCED ZONE OF THE MSE WALL.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

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BRIDGE APPROACH SLAB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-31
1			3			TOTAL SHEETS
2			4			33

DRAWN BY : VKS	DATE : 9-18	DESIGN ENGINEER OF RECORD: T. TOWNSEND	DATE : 10-18
CHECKED BY : MLO	DATE : 9-18		

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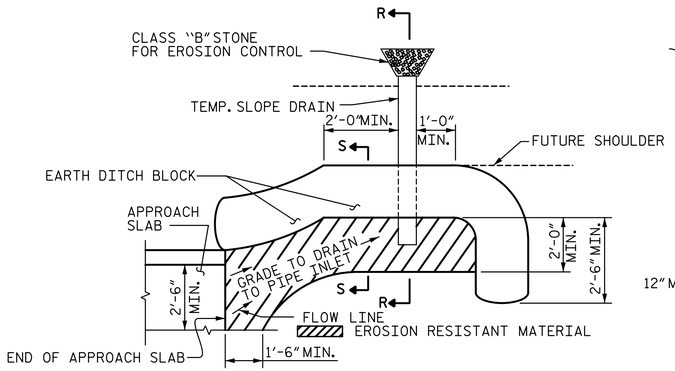
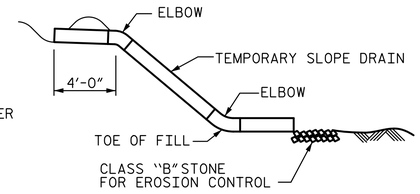
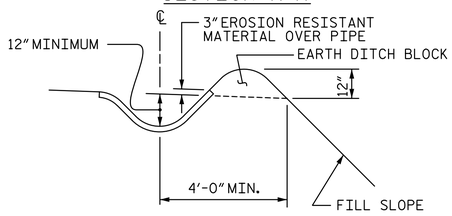


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW



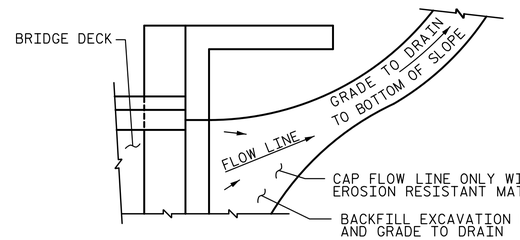
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

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SHEET 2 OF 2

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APPROACH SLAB DETAILS FOR INTEGRAL ABUTMENT

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1			3			TOTAL SHEETS
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STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

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STANDARD NOTES

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			33

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